

# MINING WORLD

APRIL, 1950

VOL. 12 No. 4

Published monthly  
in London, E.C.

With which is combined **THE MINING JOURNAL**

## Buckets

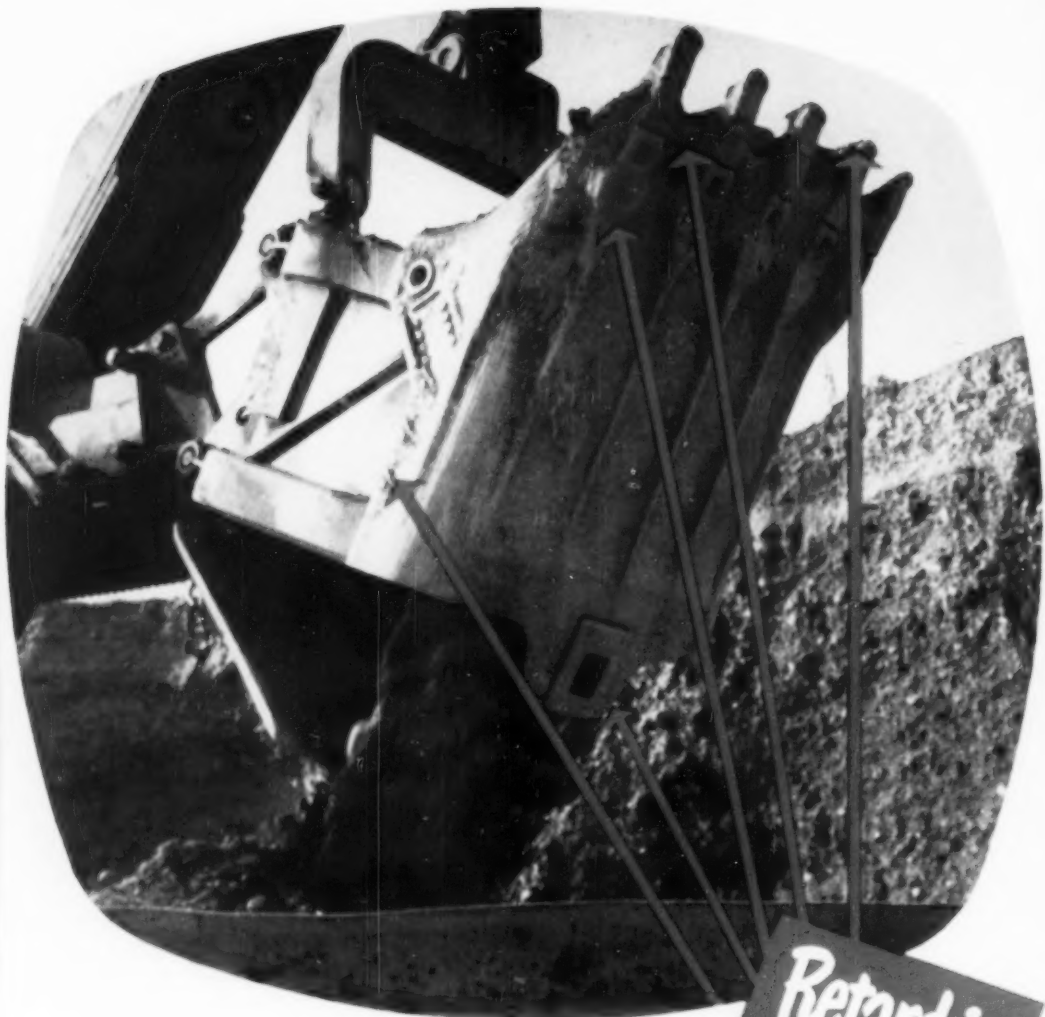
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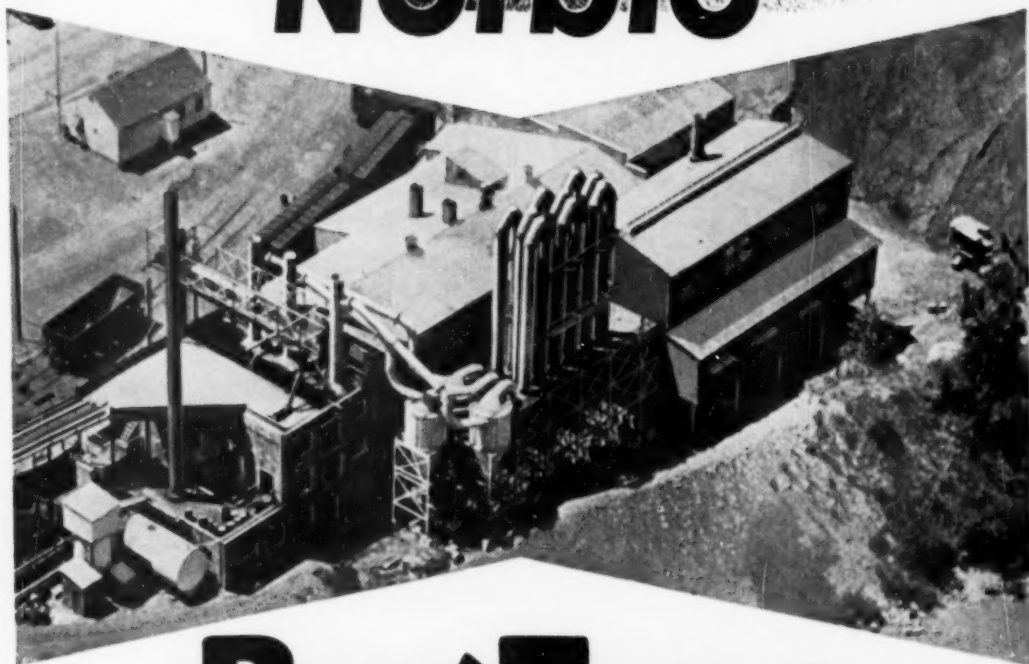


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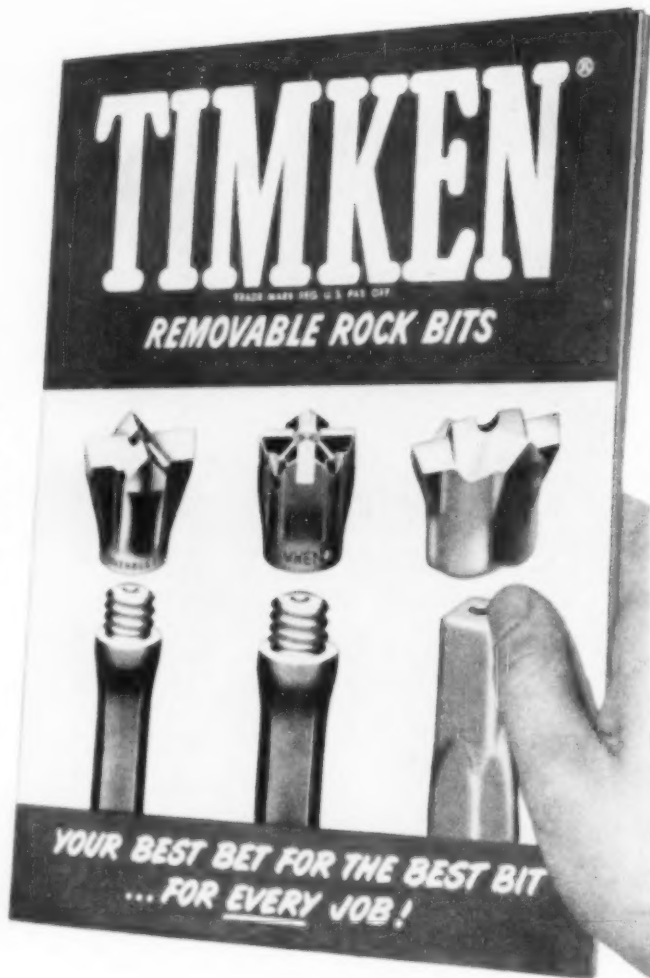
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# MINING WORLD

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**A Miller Freeman Publication**

Published monthly except in April when publication is semi-monthly

**APRIL, 1950**

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### PUBLISHING OFFICE

San Francisco 5, Calif. 121 Second Street  
GArfield 1-5887

### BRANCH OFFICES

Seattle 4, Wash. 71 Columbia St. MAin 1626  
Los Angeles 12, Calif. 124 W. Fourth St. MUtual 8196  
Vancouver, B. C. Royal Bank Bldg. MARine 1520  
New York 17 370 Lexington Ave. MUrray Hill 3-5225  
Chicago 4556 N. Pauline. LOngbeach 1-2796

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Published by  
AMERICAN TRADE JOURNALS, INC.  
MILLER FREEMAN, President  
L. E. SMITH, Vice President  
W. B. FREEMAN, Publisher



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### SUBSCRIPTION RATES

U. S., North, South and Central	
American Countries	\$3.00
Other Countries	\$4.00
Single Copies	\$0.35
Directory Number	\$2.00

## DRIFTS AND CROSSCUTS

### Uranium Miner Needed

The recent resignations of David Lilienthal as Chairman of the Atomic Energy Commission and Commission member Lewis Strauss again leaves two unfilled positions on the Commission. For a period last year the same situation existed after the resignations of Commissioners W. W. Waymack, an Iowa editor, and Robert Bacher, a physicist who had much to do with development of the original bomb.

Sumner T. Pike is now the active chairman of the Commission. The other members appointed last year are: Dr. H. D. Smyth, former professor of physics at Princeton University, author of the famous Smyth report; and Gordon Dean, former professor of law at the University of Southern California.

These gentlemen are all eminently qualified in their respective fields, but none of them have had any experience in the discovery and production of domestic uranium ores. In fact domestic uranium has been a step-child of the Commission.

Great publicity, and rightfully so, has been given to the Commission's reactorship propulsion program, the breeder program and new construction at Hanford and Oak Ridge. Popular magazines feature stories and pictures of Martian like workers in the vast and complex plutonium and U-235 plants. These workers live in tree shaded, grass bordered, low rental, newly constructed A.E.C. houses.

The public has never heard of the domestic prospector and independent uranium producer who fights rattlesnakes for the shade of his desert tent, hauls water for miles, and most importantly discovers and mines carnotite ore. The public probably never knew, nor would it have realized the importance of the fact that Colorado carnotite largely fueled the first atomic bomb.

The importance of domestic uranium is now greater than it ever has been because of the growing intensity of the "cold war," the need for increasing amounts of uranium to fuel the stepped up program of atomic energy as a peace time fuel and the little known fact that uranium is the most essential raw material from which plutonium or U-235 is produced. One of these must be used to generate the terrific heat and pressure necessary to make the hydrogen bomb explode, when and if the hydrogen bomb becomes a reality.

In a recent speech, acting chairman Pike reported, "We have had practically no success in finding new beds of ore through a program to stimulate search for uranium." This disclosure by Mr. Pike most certainly emphasizes the importance of Colorado Plateau uranium for the betterment of mankind and the preservation of civilization.

The President, Congress of the United States, and all thinking citizens must be made to realize the importance of domestic uranium in this Atomic Age. It logically follows that this realization can best be brought about by having an experienced mining engineer, well qualified by years of actual uranium mining and processing experience as a member of the Atomic Energy Commission.

A mining engineer, a uranium miner, is needed to fill one of the two existing vacancies on the Commission. Acting Chairman Pike has indicated he may resign in the near future so the President may have a third vacancy to fill. It seems logical that a uranium miner should be appointed to fill one of these vacancies.

—Ed.

# GREAT GRADERS

*...and here's the proof!*

THEY'RE not guessing about the performance of "Cat" Diesel Motor Graders at the Butler Bros. Mining Company, St. Paul, Minnesota. They know from experience these husky yellow machines really pay off around a mine. The better the roads, the faster the hauls and the less damage to trucks—and a "Cat" Grader does a whale of a job on this important task all year round.

Here you see this outfit's "Caterpillar" Diesel No. 12 Motor Grader busy at its South Agnew Mine, Hibbing, Minn. Besides keeping truck haul roads in shape, the No. 12 also 'dozes and levels sand cushion for the mammoth walking drag-line. When winter comes, you'll find it busy pushing snow. No slow-down on the job with this hustler at work! Its speed, positive mechanical blading control and in-built stamina all

contribute to extra production hours with a minimum of down time. In addition to the No. 12, the company has a flock of "Caterpillar" Diesel Tractors in its fleet. "We have used 'Caterpillar' products in our mines for a long while," says a Superintendent. "We are satisfied they are the best for our pits."

Whatever the grading job, there's a "Cat" Diesel Motor Grader the right size to do it most efficiently and economically for you. And there's a capable, well-equipped "Caterpillar" dealer near-by who's ready round the clock to give you "Johnny-on-the-spot" service. He sincerely believes this rugged yellow machine is the best in the field. Ask him for full proof of its performance!

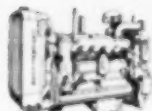
Caterpillar Tractor Co. • San Leandro, Calif. Peoria, Ill.



Only "Caterpillar" designs and builds every part of the famous "Cat" Motor Graders. This undivided responsibility is your assurance of a long life of efficient economical performance.



Each of the 3 sizes of "Cat" Motor Graders is a completely different machine. There's no performance penalty due to excessive frame weight; too little power or poorly matched working parts.



Only "Caterpillar" Motor Graders have the dependable yellow engines—the power plants that are world famous for delivering 60-minute-hour performance every hour day in and day out.



Lubricating oil is cooled in this radiator section to minimize carbon lacquer and gum formations—enemies of long engine life. Lower temperatures preserve the lubricating qualities of the oil.



Safe and sure Diesel starts are assured by this electrically started gasoline engine. It warms the coolant and allows the Diesel to circulate "lube" oil before actual starting.



Castings like this cylinder head on "Cat" Diesels are made right in "Caterpillar's" own foundry, where tolerances and quality can be closely controlled—another example of precision engineering!

# CATERPILLAR

Engines • Tractors • Motor Graders



Typical of "Caterpillar" quality are these aluminum alloy pistons. Tops are oil sprayed for coolness and long life. Cast iron compression-ring belt keeps this vital ring working at top efficiency.



"Caterpillar"-built fuel injection equipment is trouble-free and fool-proof. Injection capsules and pumps can be replaced on the spot in the field — no adjustments are necessary.



Exclusively "Caterpillar," these solid aluminum "con" rod bearings give low rate of wear, ability to carry heavier loads, exceptional heat transfer characteristics and high corrosion resistance.



"Caterpillar" Motor Graders are designed for exceptionally good operator visibility. Sitting down, the operator can see toe and heel of the blade with equal ease. That helps keep jobs moving.



Mechanically operated controls give the user the constant control that is so necessary for precision work. They're quality built — changes in temperature do not affect them.



"Caterpillar's" exclusive side-shift mechanism allows extreme blade positions without the need for manual adjustment of linkage. You'll find this a real work- and time-saver on the job.

# DIESEL

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The steel headframe, water pumps, air compressors, underground communication system, power plant and hoisting machinery are all of the latest design. The hoist rope selected to match the dependability and safety of this excellent equipment is Bethlehem Purple Strand.

Engineered to handle heavy loads, Bethlehem Wire Ropes give long, economical service in the multitude of jobs around metal mines. They are well suited for use on all kinds of shaft hoists as well as incline planes and scrapers. See your distributor for full information on the constructions, sizes, and grades of these high-quality ropes.



MINING WORLD



## LEGALITY OF L-208 TO BE TESTED BY CALIFORNIA GOLD MINE'S SUIT AGAINST U. S. GOVERNMENT

What is perhaps the first suit against the United States Government contesting the gold mine closing order, L-208, has been filed by the Oro Fino Consolidated Mining Company, a California concern. Several years ago the probable illegality of WPB Order L-208 was pointed out, inasmuch as it was issued by the wrong agency. The matters dealt with, it was said, were properly within the authority of the War Manpower Commission rather than the War Production Board.

There was a distinct feeling on the part of several members of the WPB legal staff that a mistake had been made and this opinion was reflected in the official historical report of the WPB dealing with L-208. It seems remarkable that so much time has elapsed before someone made the attempt to test the validity of the order in the courts.

### ● Engle Attacks Foreign Mine Aid

According to a speech by Representative Clair Engle in the House of Representatives, the American government is spending millions of dollars opening up large-scale mining in Africa while our own mines are permitted to close down. Engle quoted an article stating that \$230 million of Marshall Plan money had gone into French African territory. Said Engle: "The minerals and metals developed with American money in foreign lands will not help us, and without production of our own we will be easy victims of our own stupidity."

### ● Cordero Gives Up

Another corpse in the wreckage strewn across the mining country by the Administration's anti-domestic mining policy is the last, or almost the last of the quicksilver mines, the Cordero in Humboldt County, Nevada. Cordero had hung on in a limping fashion hoping for something good to happen, but it never did.

### ● Access Road Program Studied

A recent item from Canada states: "The government has under consideration revival of a program of financial assistance to individual provinces for the construction of mining roads."

The wartime access roads program which opened the way to so many small mines in the United States was, in spite of a certain amount of red tape, a very considerable success. So far attempts to revive this program have not made much headway. However, it is reported that Senator Hayden of Arizona is taking a definite

## There's Good News For the Kremlin

On March 16th, economy-minded Congressmen defeated passage of S. 2105 on a House of Representatives roll call vote. The final vote was 166 against and 144 for passage.

The Bill passed the Senate at the first session of the 81st Congress on October 6, 1949. The House vote of March 16th followed a March 13th House vote of approval agreeing to bring the bill to the floor.

S. 2105 (O'Mahoney Bill) was drawn to: Develop and maintain, through private enterprise, mineral reserves in the United States vital to the Nation's security and industrial needs.

It is axiomatic that the nation having the strongest mineral producing industries backed by adequate available reserves will win the "cold war."

Some Congressmen will learn this truth the hard way.

interest in proposals for new legislation. It was Senator Hayden who supported the wartime access roads program in the Senate Appropriations Committee.

### ● Subcommittee Approval Given

H. R. 4800, a bill which passed the House June 29, 1949, has been reported favorably to the full Senate Committee on Agriculture by a subcommittee. The bill will permit the holders of certain farm lands purchased from the United States to acquire the mineral rights which were reserved when the surface rights were sold.

### ● Increase in Budgets Noted

An increase of over a million dollars for the Bureau of Mines appro-

priations for the fiscal year 1951 will bring the Bureau's budget to \$25,674,700 if the sum asked for is approved by Congress. The U. S. G. S. also is asking for an increase in its funds over this year's budget. It wants about 4 millions more, or a total of \$20 million for fiscal 1951.

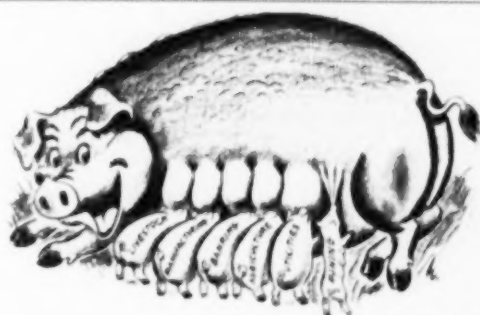
### ● Senator Langer Backs Mining Program

It is interesting to note that the bellicose Senator from North Dakota, Senator William Langer, is taking up the cudgels in the Senate for the domestic strategic and critical mining industry. In a Senate speech recently Langer lashed out at the administration, charging "the mining industry is now being ruined." You don't know the half of it, Senator!

### ● New Proposal Hits Mine Leasers

The Social Security amendments bill H. R. 6000, which passed the House of Representatives during the last hours of the last session of Congress, will be the subject of hearings before the Finance Committee of the Senate. This bill has a provision that is very important to persons interested in mine leasing. It gives the Treasury Department broad discretionary powers to determine who is an employee. Essentially, it repeals the Gearhardt resolution which became law in the second session of the 80th Congress and has maintained the status quo of mine lessees as independent contractors under the Social Security Act.

A report by the Congressional Joint Committee on Internal Revenue Taxation, following a study of this bill, reaches the conclusion that mining lessees have been held in the past to be independent contractors, but under the economic control tests set forth in H. R. 6000 they would be classed as employees.



Courtesy Colorado Mining Assoc.

The mining industry finds itself in an unstrategic position.





General view of Iroquois mine surface plant. On the left is the Quonset-type building housing the compressor, miners' dry and power plant. The portal of the 800 foot crosscut is just to the right of this building.

Sierra mill of Goldfields Consolidated Mining Company ten miles south of Leadpoint, Washington, treats Iroquois mine ore under contract. Mines Management, Inc., operators of the Iroquois, will use Sierra milling results as a guide to determine the best flow sheet and equipment to be incorporated in their own mill.



## WASHINGTON'S IROQUOIS MINE

**Mines Management, Inc., speeds exploration and increases production at state's newest large scale zinc-lead-silver producer in Stevens County**

The most recent sizeable base metal development in the State of Washington is the Iroquois, a lead-zinc property of Mines Management, Inc. C. O. Dunlop, president, and W. R. "Randy" Green, mining engineer, in charge of operations. Franklin Paparich is general mine foreman and Robert Williams mining engineer.

Situated in northeastern Washington's Stevens County, the mine is about 20 miles from Northport and four miles from Leadpoint, lying at the head of a small valley in a rather rugged timbered area.

Something of a record for developing an orebody with a small crew has been achieved at the Iroquois as the figure of 13 of advance daily has been attained regularly, working one shift only. An advance of nearly 400 feet per month has been noted with the crew and machines mentioned in this article.

The mine, for such it is, has been developed from the prospect stage, in the short span of nine months and today has ample reserves blocked out to warrant production on a 300 ton per day scale.

### Large Orebody

Blocked out dimensions of the orebody approximate 60' wide, 450' long

and, at this time, have an indeterminate depth. Development work is going ahead rapidly with both lateral and vertical workings proceeding at full speed.

At present, the main crosscut is 800' long, and 2,030' of lateral workings — drifts and crosscuts — have been driven. All lateral openings are driven 7 x 8' in the clear and little timber is used.

A partially oxidized zone of mineralization, approaching 100' thick, occurs on the hanging-wall side of the unaltered sulphide orebody. At this date, insufficient work has been done on this portion of the orebody to determine if it will be possible to treat the material in the mill and it is possible that the oxidized tonnage may not be amenable to economic methods of treatment.

### Mineralogy and Assays

Sphalerite and galena are the principal minerals followed in order of prominence by chalcocite, pyrite, cerussite, smithsonite and hydrozincite. Gold and silver are present in small amounts and it is suspected that both of these metals are associated with the copper-bearing chalcocite. This is an unusual happening inas-

much as lead-zinc mineralization usually has a certain value in associated silver. Average zinc content of the ore is approximately five percent, and lead values average about one percent.

The ore shows a rather remarkable zinc mineralization in a breccia. Concentric layers of honey-colored rosin pack, some of them beautifully spaced, are found about fragments of limestone. Most of the sphalerite, however, is found in disseminated specks and grains in the brecciated mass.

Galena occurs much more erratically than sphalerite, generally in strong concentrations at widely and irregularly spaced intervals and, although pyrite is found rather uniformly distributed, chalcocite, too, is distributed erratically.

### Power and Compressed Air

The workings of the Iroquois are about 50' above the floor of the valley. Compressor house, tool house, miners' dry, motor stable and battery charger and power plant are all housed in a 48 x 20 Quonset-type corrugated iron building. A separate frame building is used for housing tools, detachable drill bits and steel and oil and grease. Other installations

include a 1,000 gal. diesel fuel storage tank and a 500 gal. fuel oil tank.

A Caterpillar diesel powered 21 kw generator is employed to charge cap lamp and locomotive batteries and to propel the Coppus 5 hp fan used to push air into the development headings.

Mining machinery and equipment is first class and fitted to the job. The compressed air plant is a 500 cfm Chicago Pneumatic Tool Company machine driven by a Caterpillar D-13000 engine. The mucking machine is a Gardner-Denver GD 9, and its performance is excellent. Movement of ore and waste is taken care of by a fleet of standard Coeur d'Alene mine cars—two ton capacity—and an Atlas Car & Manufacturing Company double reduction spur gear drive type "K" locomotive.

#### Drills and Jumbo

Drilling is done with two Chicago Pneumatic Tool Company CP 50N Rotorfeed drifters and two C-P 44 stopers. One sinker is on the job, a C-P 42.

PM throw away bits, manufactured by the Hayes Company of Canada, are used on all drilling machines and give exceptionally good service.

A shop-made jumbo is used on lateral development work. The jumbo mounts two drills on separate columns made up of three inch Gardner-Denver air bars mounted on a standard Coeur d'Alene mine car truck. To allow setting up on uneven surfaces, the air bars are mounted on a gear hinge. The jumbo is compact, light and transferred easily from one working place to another.

#### Standardized Operations

At the time MINING WORLD visited



Motorman Carl Frederickson backs a string of empties into the heading with the Atlas Car and Manufacturing Co.'s "K" type storage battery locomotive.

the property, drifting and crosscutting operations had been standardized as a result of experience obtained from over 2,000' of development work. A closely coordinated plan that employed a crew of four men had been worked out and was operating without friction. Two operators manned the drills on the jumbo and a muck crew made up of a motorman and a mucking machine operator cleaned up the broken ore and rock in the various headings.

A standardized drilling pattern was followed as the orebody, for all practical purposes, is rather uniform in physical characteristics. The first mining was done using a 27 hole round with two burn cuts. Fragmentation from this type of round was so small, however, that this practice was discarded and another round substituted that employed fewer holes and

used less powder. The round used today is a 22 hole round that employs only one burn cut.

Blasting is accomplished by loading the holes with Columbia dynamite having electric blasting caps employing five delays. About one stick of powder per foot of hole is used as the ground is fairly tight.

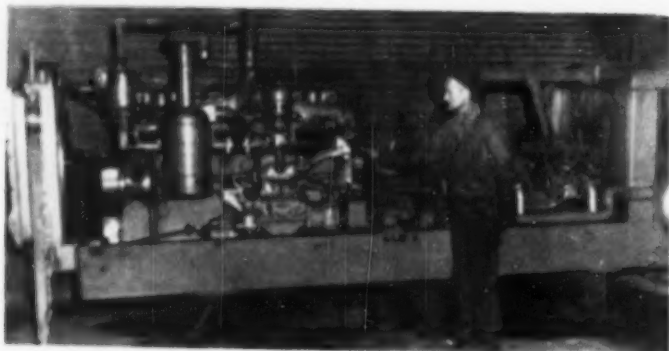
#### Throw-Away Bits and Steel

PM throw-away type bits are used exclusively. These bits are unique in that they are not threaded or grooved to fit the shank of the drill steel. Instead, they fit over a round machined shank, the blow of the drill setting them up tightly as they are pressed into the collar of the hole.

Upkeep of the PM bits and shanks is simple and is exceptionally low priced. Broken shanks are reground

Left: Iroquois Mine staff at face of development drift (left to right) Robert Williams, mining engineer; Franklin Paparich, general mine foreman, and W. R. Green, manager. Right: George Jensen (left) and Carl Frederickson load two-ton Coeur d'Alene cars with raise muck. Note how fine the braced ore breaks.





Chicago pneumatic PQ 8-500 compressor driven by a D12000 Caterpillar Diesel engine is checked by compressor man Theodore Barry.

in the mine shop. No special machine or attachment is needed and shanks are ground to the desired diameter with an emery wheel.

Drill steel for drifters is furnished in 42, 66 and 96" lengths, steeper steel in 24, 42, 69 and 78" lengths. All steel is one inch in diameter. Bits are supplied in a number of sizes with 3-16" changes of gauge.

At the Iroquois, 18" is the average length of hole drilled with each PM bit, although the distance may be greater. Money expended in bit replacement averages one cent per foot, more or less.

### Three Headings Worked

The working cycle has been developed so that at least three headings must be worked to obtain maximum efficiency. The management's aim is to operate all machines as much of the time as possible. To accomplish this, the following system has been evolved and for the purpose of the illustration, three headings will be designated Nos. 1, 2 and 3.

Heading No. 1 is clean and ready to drill. Heading No. 2 is partially mucked clean and No. 3 has been shot recently and the muck pile awaits the muck crew.

While drilling is underway in heading No. 1, the muck crew finishes cleaning out No. 2. The drill crew completes the round in No. 1 and tears down. The next step is loading and tamping the holes, connecting the round for electric firing and shooting.

In the meantime, the muck crew has completed cleaning out No. 2 heading and has moved to No. 3. Meanwhile, the motor has been diverted from the muck train to move the jumbo while the mucking machine is cleaning up the outlying fragments from the muck pile in heading No. 3 and, upon completing the move with the jumbo, returns to handle the train for the mucking machine.

### Advantages of Jumbo

In making a new set up, the following procedure is used. Into the previously cleaned heading the jumbo is moved by using the motor. The hoses

are unwound, and coupled to the air outlet, the air bars lifted and plumbed and the drills swung into position. These operations consume at most 10 minutes. Next, the drills are raised to the desired height by manipulating the carriage with the throttle and riding the machines up the columns with the power supplied by the compressed air. The chief advantages of the two column jumbo is that it offers much greater stability than a one bar rig and the flexibility is considerably greater as it allows much more latitude in manipulating and pointing the drills.

Tearing down or dismantling the jumbo is a simple task. The drills are walked down the columns by manipulating the throttles, the columns are taken down, laid in the carriage of the jumbo, the hoses coiled up and the motor run in and coupled to the carriage. All of these items take no more than five minutes.

### Mucking and Trimming

After blasting and blowing out a heading, the muck crew moves in and takes over. With a sufficient head of compressed air, the Gardner-Denver GD 9 mucking machine loads a two ton car of muck in approximately two minutes, taking into account the need

of cleaning up the fragments scattered over the tracks. Trains are made up of five cars and are switched at the nearest spur. Ordinarily, when the heading is 100' or more from a spur, the time consumed in running the train out to the spur and switching is greater than that for mucking a car of ore.

With the short runs for dumping trains at the Iroquois, seldom more than five minutes is required to train a train out to the ore dump, empty the train and return to the heading. Time required to load, tram, dump and return a train of cars is approximately 15 minutes on the average.

The entire cycle of drilling, blasting, tearing down, mucking and setting up consumes about three hours. Average daily advance is about 13' and the monthly advance of all headings is approximately 360'.

No conventional ore bin was in use when MINING WORLD was at the Iroquois. Trains were run out and the cars dumped over the edge, the ore running down the slope where it was pulled onto a loading ramp built above the road. Ten-ton trucks were run under the ramp and the ore slushed into a chute by a Pacific Alloy Steel & Metals Company scraper powered with a Sullivan air propelled tugger hoist.

Simply, the mill circuit is made up of the following elements. An Alloy Steel & Metals Company primary jaw crusher passes the ore to a Nordberg Symons 2' low head cone crusher which, in turn, passes the broken ore to a Union Iron Works Marcy type ball mill working in closed circuit with a Colorado Iron Works Co.'s Akins spiral classifier. Underflow from the classifier goes to a bank of Denver Equipment Company flotation cells for removal of the lead values, the floated product passing to an American-type disc filter, the zinc bearing portion being passed to a second bank of Denver Equipment Company flotation cells for removing the sphalerite. The zinc concentrate also goes to an American-type disc filter for dehydration.

Galena is floated from Iroquois ore by a Denver Equipment Co.'s "Sub-A" flotation machine.



# URANIUM RECOVERY AT MONTICELLO

**War-time vanadium plant has been redesigned  
to process four types of uranium-vanadium ores**

By M. G. McGrath

*This is the second of a series of articles presented by MINING WORLD covering the domestic uranium industry. The February issue described prospecting and mining in the Colorado Plateau area: southwestern Colorado, southeastern Utah, northwestern New Mexico and northeastern Arizona. Mr. McGrath's paper was delivered at the 53rd convention of the Colorado Mining Association, and describes the AEC's Monticello, Utah uranium-vanadium treatment plant which has been processing ores from the Plateau since September, 1949.*

—ED.

The Monticello plant was constructed during World War II as a vanadium plant. It is located in the town of Monticello in the southeastern corner of Utah and was selected for a plant site for two reasons. First, it is near the center of one of the large uranium-vanadium producing areas in the Colorado plateau; and second, a supply of water was available. A water supply is important when it is remembered that the producing region is arid.

Original plant construction and design was done by the Stearns-Roger Manufacturing Company of Denver and the plant was operated by the Vanadium Corporation of America as agents for the Metals Reserve Company, from August, 1942, until February, 1944. During the period from February, 1944, to November, 1948, the plant was inactive. In 1948 the AEC, as a part of the Colorado Plateau uranium ore procurement program started the rehabilitation of the Monticello plant as a uranium and vanadium processing plant to treat ores procured in accordance with the terms of the domestic uranium ore procurement plan. The first ores purchased under the plan were received by the American Smelting and Refining Company, acting as sampling and ore buying agents for the AEC, at the

AEC owned Monticello sampling plant in August of 1948. Design work for plant rehabilitation was started in October of 1948, construction began in November and the plant was placed in operation in September, 1949.

The Monticello plant operations by the Vanadium Corporation of America were in two phases: The first period of operation produced only vanadium, the second phase produced an intermediate uranium product which was supplied to the Manhattan Engineering District, and a finished vanadium product. In converting from a vanadium plant to a uranium and vanadium processing plant, modifications were made to the crushing circuit; the roasting section was not altered, but the leaching section was completely rebuilt to include fine grinding, countercurrent washing, and continuous filtration.

## **Changes Assure Flexibility**

The changes in equipment, methods of handling materials and the flowsheet changes were required to modify the mill in such a manner that the types of ores delivered under the domestic ore buying program and in accordance with AEC Circular No. 5 could be treated. The terms of Circular No. 5 do not place a minimum vanadium content on ores to be purchased; therefore, a large portion of the ores delivered to the Monticello buying station are not truly vanadium ores and in many cases contain as little as two-tenths to five-tenths of one percent V<sub>2</sub>O<sub>5</sub>. The new flowsheet of the mill is so arranged that the low grade vanadium ores can be treated directly without the high temperature chemical conversion of the vanadium minerals to soluble sodium vanadates.



The Monticello, Utah, uranium-vanadium plant of the Atomic Energy Commission. Extensive rehabilitation of this World War II vanadium plant has converted it to the country's most modern uranium-vanadium ore treatment plant. Four types of Colorado plateau ores are now being treated.

It should be noted in the detailed description of the flowsheet of the Monticello plant that this operation, both equipment wise and in principle, is the analogue of a cyanide operation, the solvent being a soda ash solution. Sulphuric acid is the precipitant. The ores are roasted as is the case in many cyanide plants. The grinding and countercurrent washing circuit is identical in equipment and flow with a cyanide plant.

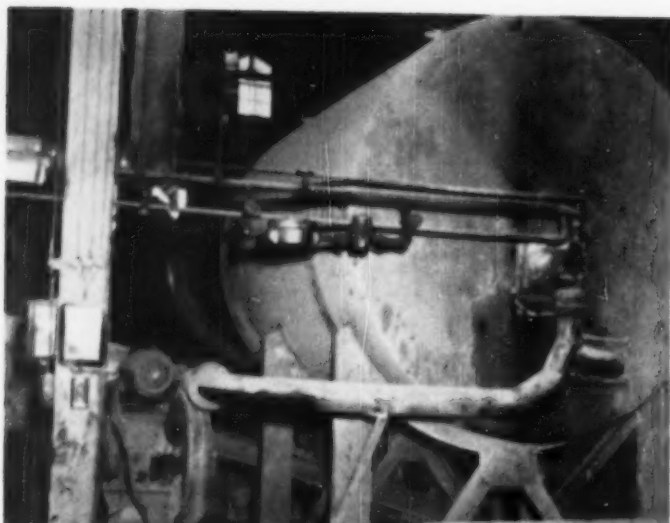
The Monticello plant is owned by the U. S. Atomic Energy Commission and is operated for the commission by The Galigher Company of Salt Lake City. The designed plant capacity is 100 tons of carnotite ore per day, and the process for treatment of the ore consists essentially of a roasting operation to convert the minerals existing in the carnotite ores to a soluble form followed by soda ash leaching of both uranium and vanadium from the roaster calcine. The recovery of metal values from the leach solutions is effected by pH control. This type of chemical roast and leach process is now generally practiced in uranium-vanadium plants throughout the Colorado Plateau area.

## **Small Lot Ore Purchasing**

The ore shipments to Monticello are received by truck, weighed on truck scales, and dumped on concrete

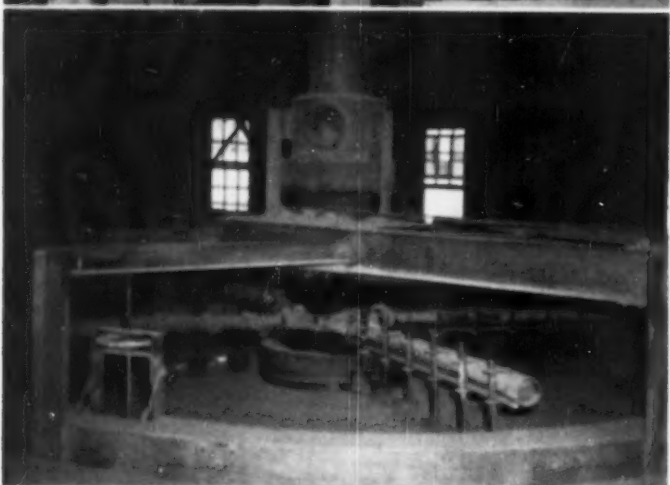


Mr. McGrath is eminently qualified to present this paper on Uranium-Vanadium milling. In addition to his present position as AEC Metallurgical Engineer, he has been mill superintendent for both the U. S. Vanadium Corporation and the Vanadium Corporation of America at their Colorado vanadium and uranium plants. Mr. McGrath's degrees include a B.S. and M.S. in Metallurgical Engineering from the University of Utah. He has held important positions with Cerro de Pasco Copper Company and Basic Magnesium, Inc.



receiving pads. Each truck load is moisture sampled at the time of receipt and dumped. The truck deliveries are accumulated from any one shipper until such time as the shipper's specified lot size has been reached. This amount varies from a minimum of ten tons to fifty tons or greater with the average lot size being approximately twenty tons. Under special conditions less than ten ton lots are accepted. The accumulated lots are then loaded in trucks and passed through the AEC sampling plant.

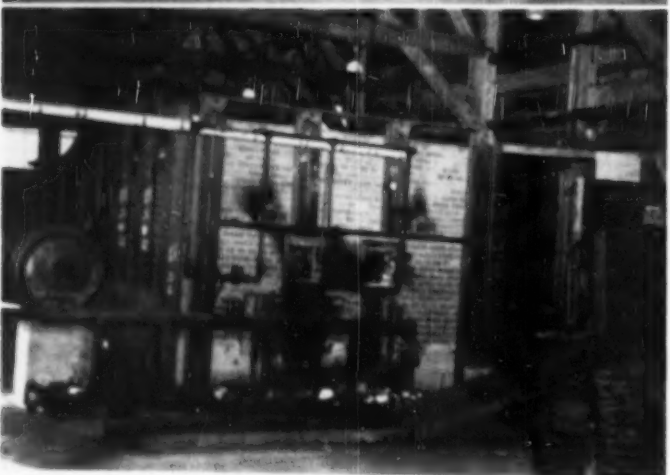
This sampling unit is a conventional ore sampling plant consisting of an Austin Western primary jaw crusher 15 x 24" through which the ore is crushed to minus 1 1/2". A belt conveyor carries the crushed ore to an



Top: Discharge end of Stearns-Roger 5 diameter by 40 long oil-fired kiln drier used to reduce moisture content of wet ores before screening to minus 10 mesh.

Center: Top, or drying hearth, of the eight-hearth Colorado Iron Works Company's Skinner roaster. Ore is fed through the chute at left and robbed to the drop holes on the outer edge of the hearth. The roaster is operated at varying temperatures depending on type of ore being treated.

Bottom: The vanadium precipitate, or "red cake" is fused to an 87 percent V<sub>2</sub>O<sub>5</sub> "black cake" in this oil-fired fusion furnace.



A. S. & R. Vezin type splitter which removes a 10 percent by weight sample. The sample is then reduced in size 3/4" by a 10 x 20" Tel-smith crusher and passed over a second Vezin which removes a 10 percent sample from the original sample. This sample is then passed through 7 x 10" Roger Ironworks jaw crusher and reduced to a 3/8" size. The entire sample is then dried, passed through a McFarlane Eggers Englebach crusher and split down to size for laboratory pulverizing and splitting.

#### Four Types of Ore Treated

All rejects from the sampling plant are stockpiled at the mill site according to the types of ores received. The stockpiles consist of the following ore types: low vanadium-low lime, high vanadium-low lime, low vanadium-high lime, and high vanadium-high lime. The Monticello mill circuit can be so adjusted that each stockpile of the types described can be treated separately in order to effect the most economical recovery of vanadium and retain a constant recovery of uranium. The ores are loaded from the stockpiles to dump trucks and are trucked to the coarse ore mill bin. From the ore bin the coarse ore is fed by an apron feeder to a 20 x 20" Holland breaker which is in closed circuit with a 4 x 8 Robins vibrating screen.

MINING WORLD



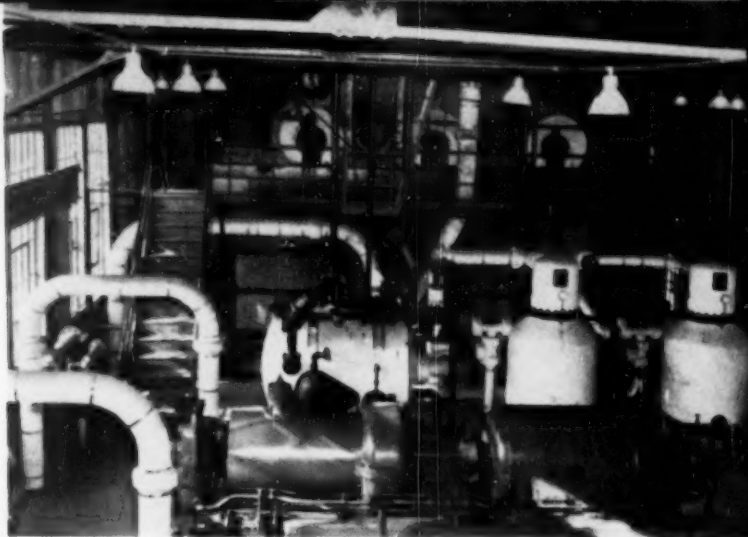
The ore is screened through 10 mesh. The circulating load within the crushing plant is approximately 125 percent. When moisture conditions due to rains or snows affect the ores so that screening is difficult, the crushed ore stream is passed through a 5' diameter by 40' long Stearns Roger oil-fired kiln drier. The crushing plant produces 100 tons of minus 10 mesh material from a 1½" feed at the rate of 100 tons per six operating hours. The crushed and screened ore is carried by belt conveyors to the fine ore bins adjacent to the roasting department.

#### Roasting Varies With Ore Type

The roaster is an eight-hearth Colorado Iron Works Skinner with 18' diameter hearths. It is oil-fired through two combustion chambers with fire ports on the sixth and eighth hearths. It is equipped with an automatic regulator and the temperatures on each hearth are automatically and continuously recorded. The roaster temperature is adjusted in accordance with the type of ore being treated by the plant. In the case of low vanadium ores, the temperatures are set at approximately 400° C.

In the case of high vanadium ores requiring salt roasting, a temperature of 800° C. is maintained. The calcine from the roaster drops to a quench launder and is mixed with a 5 percent soda ash solution. The quenched pulp flows by gravity to a standard grinding circuit consisting of a 5 x 6' Einco ball mill in closed circuit with a 4 diameter x 17' Colorado Iron Works Akins classifier. The sands in the pulp are ground to grain size, or approxi-

Multiclone dust collectors are used throughout the plant. They have been very effective in maintaining a clean plant and recovering small particles rich in values.



Turbine floor and boilers in the A. E. C.'s steam-electric power plant. The power plant consists of two 300 hp. Babcock and Wilcox bent tube boilers, and two 500 kw. Allis-Chalmers turbines with necessary condensers, pumps, blowers and water-treating system.

mately through 65 mesh. The ground pulp is pumped by a 2" Wilfley pump to three Galigher Co 10 x 10' agitators to effect dissolution of uranium and vanadium. The pulp then flows through a countercurrent washing system consisting of 4 Morse Brothers' 30' thickeners in series. The underflow from the No. 4 thickener is pumped to an Esperanza classifier in which the sands and slimes are separated. The sands are dewatered and washed on a 11½' diameter Oliver horizontal sand filter. The slime portion of the pulp is dewatered and washed on three 6' diameter by 6' long Peterson disc filters operating in series.

The filtered and washed sands and slimes are the plant tailings and are dry stacked by a belt conveyor system. The dry stacking of sand tailings results in considerable water saving to the plant. Difficulties of laundering coarse sands to tailings ponds or stacks have been overcome. Due to the location of the tailings disposal area, it was necessary in the original plant to pump all tailings; by dry stacking a greater tailings disposal areas was made available.

The pregnant liquors are bled from the circulating liquors forming the quench circuit and are pumped by a 1½" Kimball Krough pump to rubber-lined 12 x 12' agitator tanks. By means of pH adjustment, using sulphuric acid, uranium yellow precipitate is formed and filtered from the solutions by 36 x 36" Sperry filter presses. The filtrate containing vanadium is then pumped to a 8 x 8' rubber-lined agitator tanks where by means of further pH adjustment with sulphuric acid vanadium red cake is precipitated. The waste liquors are

filtered from the red cake on filter bottom tanks. The red cake is then dried and fused to 87 percent V<sub>2</sub>O<sub>5</sub>, "black cake." The uranium yellow precipitate is further refined by a reduction fusion to form a black reduced uranium oxide which is dried and drummed or packaged for shipment to the Atomic Energy Commission.

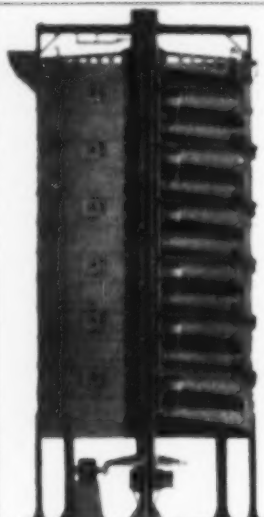
Rotoclone dust collectors were installed in the crushing and grinding section, the roaster section, and the vanadium drying and fusion section of the plant. The operation of these dust collectors has proved to be very satisfactory in maintaining a clean operation and effecting a very appreciable recovery of values.

#### Surface Installations

Water for the plant is obtained from the town of Monticello, Utah. Collecting works for water are established in four major spring areas in the Abajo Mountains near Monticello. Electric power and steam requirements are provided by the AEC's own plant. This was required since there are no sources of electric power in this area. The power and process steam plant for the plant consists of two 300 hp. Babcock & Wilcox bent tube boilers, two 500 kw Allis-Chalmers turbines and one 700 kw Cooper-Bessemer Diesel electric generator. The fuel for the power and steam plant is trucked to Monticello and stored in three 100,000-gallon tanks. The plant has a well equipped blacksmith shop, machine shop and garage.

Due to the fact that Monticello is a small and remote community, local housing could not be obtained for the plant personnel. The AEC has constructed housing for the plant operations personnel.





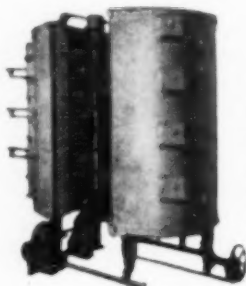
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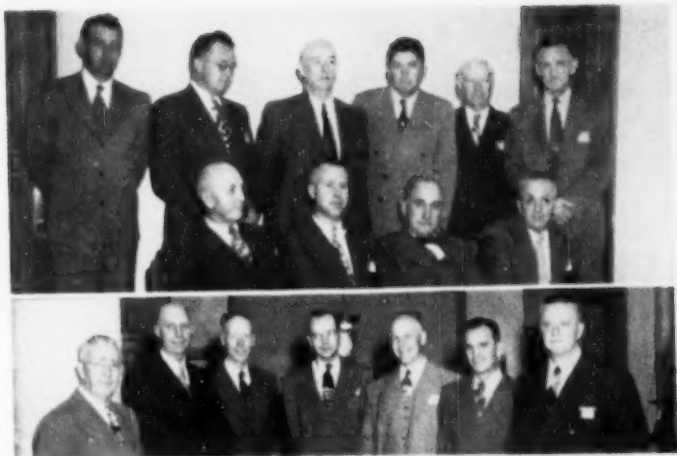
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## NEW MEXICO MINERS MEET AT SILVER CITY



The 1950 Convention of the New Mexico Miners and Prospectors Association was appropriately held January 19-21 at the Murray Hotel, Silver City, in the heart of New Mexico's largest copper and zinc mining district. A full program of papers covering all phases of New Mexico's metal and non-metallic mining industries was presented. The suppliers' cocktail party, the annual dance of the association, and the main banquet on January 21 provided entertainment for those in attendance.

### Mechanized Mining

Raymond W. Jenkins, Special Field Engineer for the Joy Manufacturing Co., Pittsburgh, Pennsylvania, presented the meeting's outstanding technical paper on "Recent Developments in Mechanized Mining for Hard Rock Conditions." This paper was of special interest to the Carlsbad potash operators who have helped in the development of underground mechanical loading equipment.

### Legislative Problems

Otto Herres, Vice President of the Combined Metals Reduction Co., Salt Lake City, was the principal speaker at the second general session with a

discussion of "Legislative Problems of the Mining Industry." This paper outlined some of the problems imposed by government policies on domestic underground copper, lead and zinc producers. A strong mineral policy which promotes the strength of the domestic mineral industry should be developed. The only thing that American producers want is an even break with foreign producers, Herres said. He further reported that postwar domestic consumption of copper was up 91 percent, lead 71 percent and zinc 86 percent over prewar levels. The long term metal outlook is good but at present many domestic mines are forced to curtail or suspend operations because of the competition of cheaply produced foreign metals, he said.

### Mining and the Public

James K. Richardson, manager of the Utah Mining Association, addressed those in attendance at the luncheon held on January 20. His address, entitled "Are We Selling Ourselves Short?" showed that the American mining industry was far too modest, that the mining industry and the minerals produced from all types of mines have been the basis of

all human progress, but the industry has been living in past glory while exterior forces have been slowly but surely destroying it. The industry has no product which it sells directly to the public, so many citizens are unaware of mining's national importance as a basic wealth creating industry, he stated.

He urged the mining industry to sell itself to all citizens and groups through an improved plan of public relations. The press is willing and able to help a program of this type, but the industry must furnish the true story with all the facts to gain their complete cooperation, he added.

Many convention delegates took advantage of Saturday morning's field trips to observe how other operators keep production up and costs down. Inspection trips were made to the open-pit mine, mill and smelter of the Kennecott Copper Corporation's Chino division; the Groundhog mine of the American Smelting and Refining Company; the Hanover zinc mine and mill of the Empire Zinc Company; the Bullfrog mine and mill of the United States Smelting, Refining and Mining Company; the district operations of the Peru Mining Company; Phelps Dodge Corporation and the Black Hawk Consolidated Mines Company.

### Strong Policy Declaration

The Association formally declared itself as favoring: tax relief for mining; inclusion of non-metals with that group of minerals now allowed percentage depletion; a currency based on free circulation of gold and silver; prompt enactment into law of S. 2105 (the O'Mahoney Bill), a protective tariff, and retention of existing mining laws.

### 1950 Officers Elected

Wm. H. Goodrich, Hurley, President; T. M. Cramer, Carlsbad, first vice president; J. B. Carman, Questa, second vice president; Jack Pierce, Albuquerque, secretary-treasurer, are the newly elected officers.

### Meeting Draws Large Attendance From Southwest

Pictured above, at the Silver City meeting, are, left to right, top row: John A. Wood, Chapman and Wood Mining Consultants, Albuquerque; Allan B. Bowman, general superintendent, Banner Mining Co., Lordsburg; Horace Moses, retired general manager, Chino Mines Division, Kennecott Copper Corp., Santa Fe; T. A. Snedden, superintendent, Groundhog Unit, AS&R Co., Vanadium; Joseph H. Taylor, general manager, Peru Mining Co., Silver City; C. S. Elayer, mine operator, Silver City.

Middle row: H. E. McCray, manager, Burro Chief Fluorspar Mine, Deming; Jack Pierce, executive secretary and treasurer, New Mexico Miners and Prospectors Assoc., Albuquerque; Wm. H. Goodrich, general manager, Chino Mines Division, Kennecott Copper Corp., Hurley; George A. Wacner, general superintendent, Zuni Milling Co., Albuquerque.

Bottom row: Leo H. Duriez, manager, USS&M Co., Bayard; H. Hirsch, Hirsch Bros. Machinery Co., El Paso; F. C. Green, assistant general manager, Chino Mines Division, Hurley; Bob Miller, manager, Hotel Paso Del Norte, El Paso; S. S. Huyett, manager, Empire Zinc Co., Hanover; A. J. Thompson and Dr. William Camp, New Mexico School of Mines, Socorro.

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## In Tribute to a True Champion Of Mining

Addison N. Clark, mining engineer, geologist and writer, whose column has appeared in this space on alternate months for several years, passed away in Oakland the end of February. The staff of MINING WORLD join his host of friends throughout the industry in paying tribute to a true champion of the cause of American metal mining.

Clark's writings, enriched by nearly 50 years of varied mining experience throughout the West, never minced words when it came to pointing up the common-sense reasons for a healthy domestic mining industry and "an indestructible gold and silver dollar in preference to verdant paper money." As he once wrote, he believed in "slinging a mean cudgel and rooting fortissimo for a horse-sense policy when it came to domestic mining and sound money." Even his more sophisticated readers could rarely suppress a chuckle at his slam-bang straight-forward attacks on what he termed the "pot-brained planners on the Potomac." Alternately serious and humorous, his writings more often than not served to point up the true issues at stake in some of the Washington double-talk that went on during the confused period after the war.

Clark was born in Champaign, Ill., October 9, 1882, and received his higher education at the Virginia Military Institute and Montana State College at Bozeman. His professional record includes service as an engineer with the Western Electric Company, mining editor of the Engineering News in New York, and consulting engineer for many properties throughout the western states. During World War I Clark served as Captain in the Corps of Engineers, spending a year with the AEF in France with the 30th Artillery Brigade in the Verdun sector. He received the Victory Medal with three battle stars.

Widely known in the West as the "mining engineer poet," Clark divided his time about equally between consulting engineering and geological work, and free-lance writing. His articles ranged from the technical, economic and engineering variety to short stories and poetry. His editorials made lively reading; following are some typical Clark aphorisms for which he was famous:

On eastern domination of western mining he wrote:

"Financial pages are currently smoldering with dispatches (from New York, where *mines AIN'T*) anent tumbling copper and lead prices. Terms like 'Connecticut Valley basis' and 'East St. Louis' should make any red-blooded western miner see RED! How much longer are we who produce the copper OUT WEST going to have to dance to New York and Connecticut tunes? How much longer before we start refining metal where it's produced, rather than shipping it all the way across the continent as grandpa done it way back when? Great system!" Forever lashing out at the "eastern minded attitude," he said:

"We have seen the gold mining industry of our West fall off, deteriorate and plain rot on the vine (to mix metaphors a bit) because—and let's pull no punches here—of the mulish stubbornness and plain ignorance of an assortment of men 'Back East' where they mine men's pockets for gold instead of the bosom of fecund Mother Earth."

Continuing his campaign for higher gold after many others had given up, he recently said:

"What the USA needs is an indestructible dollar—and, per se, the USSR needs an indestructible ruble, minted of monetary metal. Liberation into clinking, musical circulation of some of those gold billions down-cellar at Fort Knox would be a whale of a tonic for the American and world situation—and I don't believe it would superinduce superinflation. Let's make it a spate of letters to our senators and representatives—those guys whose salaries (RECENTLY RAISED ALONG WITH EVERYTHING ELSE BUT THE PRICE OF GOLD!) you and I pay!"

MINING WORLD joins its reader in saying—"So long, Addison, WILL DONE!"

APRIL, 1950



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## LOST MINES AND BURIED TREASURES

# THE LOST DUTCHMAN GOLD MINE

The story of the Lost Dutchman gold mine has its beginning back in the early 1850's, when Don Miguel Peralta was said to have discovered a vein of very rich gold ore while prospecting somewhere to the east of the rugged Superstition Mountain. Soon afterwards Peralta was joined by his friend Don Francisco Ballesteros of Sonora, Mexico, and together they recruited a crew of miners from among the Mexicans and Indians, built an arrastre, and proceeded to open the vein.

An adobe house, with a rock foundation, was erected about a mile below the mine along the side of the boulder-strewn canyon. Near by, a rock curral was provided for the pack mules.

The ore was so exceedingly rich, it was put in leather bags and pocked on the backs of the mules to the arrastre where it was ground. As the gold was freed from the quartz it was collected in the form of amalgam and then smelted into bullion in a small adobe furnace built for that purpose.

With an abundance of high-grade ore, and with the bars of bright yellow metal piling higher each day, the two partners were in fine spirits. In addition, they had found a beautiful place in which to live and work, and the towering peaks of Superstition outlined against the deep blue of the Arizona sky were always an inspiring sight. Only one thing threatened their security—the fierce Apaches whose hand was against everyone.

The ore deposit grew richer as the inclined shaft penetrated deeper and deeper into the mountain side. To eliminate the necessity of hoisting the ore up the shaft, Peralta decided to drive a tunnel into the mountain from near the canyon and intersect the vein at depth. When the tunnel had been advanced about 50 feet a large band of Apache warriors launched a surprise attack. The mine crew and the packers were completely wiped out except for one man.

This one man, a Mexican who had escaped by hiding in the rocky canyon, later made his way to the arrastre where Peralta, Ballesteros, and Peralta's two sons were engaged in grinding ore. The five men hastily packed a few provisions, took their

rifles and ammunition, and hurried into the hills. Finally, after enduring many hardships, they succeeded in returning to their homes in Sonora.

A few of the ore-laden pack mules stampeded during the massacre and disappeared. Years later, two old prospectors remembered only as "Goldenlocks" and "Silverlocks," discovered some piles of ore in a box canyon at the northwest end of the Superstitions. This ore evidently had fallen from the Peralta pack mules, but the prospectors being new at the game and knowing nothing of the Peralta mine tragedy assumed that it came from a ledge high up on the slope. They dug many holes and trenches in a futile effort to find the source.

From this point on the legend of the Lost Dutchman mine is intricately interwoven with the story of the activities of an old German by the name of Jacob Walz, or Jacob Walz as he was known locally. Unlike many of the early-day mountain men who made their living by trapping along the streams and trading with the Indians, Walz was a miner. And if we are to believe the tales told of him after his arrival in Phoenix, Arizona, his life must have been a series of high adventures. At least his name has become one of the best known in the Great Southwest—all because of his asserted connection with the fabulously rich gold deposit.

Jacob Walz is believed to have heard the story of the Peralta mine from the survivors of the massacre while he was traveling in Mexico. Later, he made his way north to the little frontier town of Florence, Arizona, on the Gila River. He arrived there in the early 1870's, procured a prospecting outfit and headed his small pack train into the hills to search for the old Peralta workings. These workings, according to Indian accounts, had been covered up by the Apaches after the massacre in an effort to prevent their falling again into the hands of the white man.

A month later Walz reappeared in Florence looking for some one who could make a rocker of dry washer small enough to be packed on the back of a mule. He was directed to another German, known only as

Frank, who was making his living by doing odd jobs of carpenter work around Florence. While the placer machine was being made, Walz told Frank that he had located some rich placer ground near Iron Mountain, on a branch of Pinto Creek, and that he was prospecting up-stream to find the source of the gold.

On his next trip to Florence, Walz told Frank that he had found the old Peralta workings, and invited Frank to join him in working the mine. However, the carpenter knew nothing about mining and was deathly afraid of the Apaches, so he refused to go.

Later on Walz was joined by a nephew named Jacob Weiser. The two men made frequent trips into the mountains to the north, always returning with their mules loaded with gold ore which they sold in Tucson, Phoenix, and Florence.

Old Frank, who spent his last years at the Pioneers' Home in Prescott, often commented that the location of the mine did not seem to be much of a secret in the early days and that many old-timers like himself knew that it was located on a branch of Pinto Creek not far from Iron Mountain. However, one of the Poston brothers and a man by the name of Myers from Tucson who had purchased ore from Walz tried to follow him to the mine. They lost the trail at the Whitlow ranch on upper Queen Creek on the south side of Superstition Mountain.

Walz was not a naturalized citizen of the United States and for that and other reasons did not have the mine recorded.

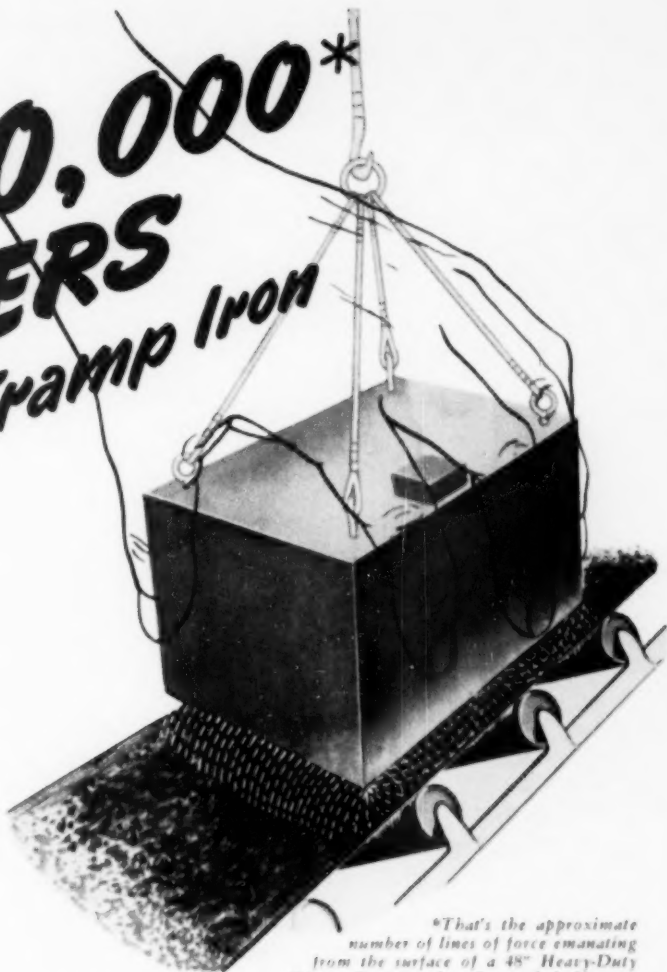
One day when Walz and Weiser returned to their claim they saw two men breaking ore at the old mine dump. The men were very dark skinned and were taken to be Apache Indians, so the Germans shot and killed them. Closer examination revealed that the two were Mexicans, and it is supposed that they had come from Mexico to relocate the old Peralta mine. Their bodies were taken to the nearby wash and covered with earth and rocks.

Sometime later Weiser was caught in a flood while attempting to cross

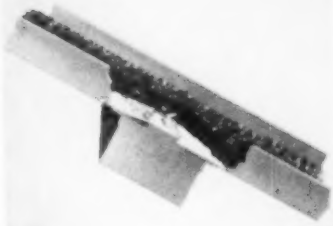
Continued on Page 66

# 8,000,000\* FINGERS Remove Tramp Iron

## It's the Dings Rectangular Suspended Magnet



\*That's the approximate number of lines of force emanating from the surface of a 48" Heavy-Duty Dings Rectangular Suspended Magnet.



The Dings Rectangular Spout Magnet is designed for installation in open or enclosed chutes to remove iron from dry materials or liquids such as coal, ore, rock, chemicals, foodstuffs, and other materials. As material flows over the magnet, iron is attracted and held securely below a step in the face against the downflow of material.



Crusher protection with a Dings Rectangular Magnet installed above chute.

THAT'S a lot of protection for your crushers, pulverizers and other expensive machinery—enough protection to allow heavier loads (up to 15 inches deep) at higher belt speeds—enough protection for the toughest tramp iron removal jobs—the kind of protection only a Dings Rectangular Magnet can give you.

And it is done at a low operating cost, with no maintenance—a 30" magnet consumes only 1000 watts.

The whole operation can be made completely automatic. The Self-Cleaning Rectangular Magnet incorporates a cross belt which carries the iron off to the side, deposits it in a receptacle, thus avoiding any labor costs. Complete removal of damaging tramp iron will save you money—the installation of a Dings Rectangular Magnet can pay for itself in less than a year.

Write to Dings for a recommendation on a rectangular magnet to answer your tramp iron problem. Ask for CATALOG 301-A.

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SEPARATOR COMPANY**  
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Top-suction also eliminates one of the most common causes of pump failure—breaking of the pump shaft seal because of water pressure.

Top-suction keeps all dirt and water away from the oil seal, bearings and air motor—actually pulls lubricant into the seal.

Write for complete information about this better sump pump.

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Gardner-Denver Company, Quincy, Illinois, U. S. A.



## GRAB SAMPLES From the Mail

### Interest in New Methods

Dear sir:

The January issue of your magazine contains two articles of particular interest to me, viz., "Small Mine Mechanization" and the advertisement of New Rock Drill Bits. Would you kindly supply the following information: Particulars of the weight, horse-power, drum capacity and size of rope of the light-weight slusher hoist pictured on page 26, also the consumption of free air per minute at various pressures. Are similar electrically driven small hoists obtainable and from whom?

I would also like details for the cruciform type of rock bits illustrated on page 53, including the price of 2" diameter bits and information on the type of thread. Our present practice is to screw a similar detachable bit onto a 6" x 1 1/4" round adapter threaded whitehall type 1 on the opposite end to joint up with whitehall threaded extensions.

B. C. Albers, Mine Mgr.,  
Thabazimbi Mine,  
Thabazimbi, South Africa

Information is being obtained from Roger Pierce, author of the article in question, and from the manufacturer of the bit, and will be submitted shortly.—ED

### Word from Ethiopia

Dear sir:

I take the opportunity of thanking you for sending WORLD MINING, regretting to add that your August number did not reach me.

Okakiro goldfields in the Sidamo province, district Jendun, are by far the most important mining business in this country. They are government owned and nowadays produce 5,000 to 4,000 ounces monthly, but produced almost double that a few years ago. The output of the other producing regions (Bent Shunggal, Wallaga) I am not familiar with, but I believe it is somewhat less. The platinum mine of Ibadu in Wallaga, formerly important, has small production at present. There is some output of mica near Harar, of salt in the Danakil desert, perhaps also of potassium salts, and of coal in the highlands north-west of Addis Ababa. The oil project by Sankar is still in the exploring stage.

With respectful regards,

Dr. N. H. van Diermonck  
Addis Ababa, Ethiopia

### Help in Restoration

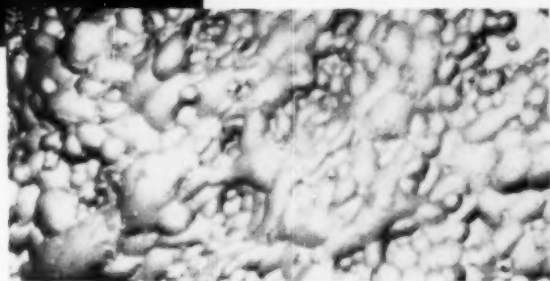
I write to thank you warmly for your interest in sending me regular issues of WORLD MINING. The excellent prospecting of the world's mineral and mining position that it presents from month to month will do much to restore international balance and equitable readjustment of the disturbed mineral trade of different parts of the world.

I wish this journal continued success.

D. N. Wadia  
10-King George Avenue  
New Delhi, India

APRIL, 1950

## Dependable Bear Brand Xanthates

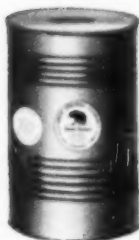


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Experience in Producing

Xanthates for Metallurgical Use."

Time and experience have demonstrated that for optimum results in the flotation treatment of substantially all sulphide ores, as well as some oxidized ores and ores containing native metals, Bear Brand Xanthates are the cheapest and most efficient collectors now available.



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- Z-3—Potassium Ethyl Xanthate
- Z-4—Sodium Ethyl Xanthate
- Z-5—Potassium Amyl Xanthate\*
- Z-6—Potassium Pentasol Amyl Xanthate\*
- Z-8—Potassium Sec.-Butyl Xanthate
- Z-9—Potassium Isopropyl Xanthate

\*From Skorpion Amyl Alcohol

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# DENVER-DILLON VIBRATING SCREENS

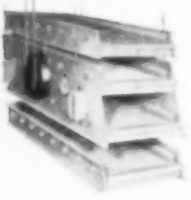
IN STOCK FOR QUICK DELIVERY...



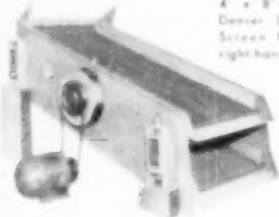
1 1/2' x 3' Double-Deck Denver-Dillon Vibrating Screen, right-hand drive, showing how 1 1/2' x 3' screen can be mounted on frame with casters.



2' x 4' Single-Deck Denver-Dillon Vibrating Screen, suspension mounting, right-hand drive.



3' x 6' Double-Deck Denver-Dillon Vibrating Screen showing how additional deck may be added. Undersize hopper and dust or top cover may be added.



4' x 8' Double-Deck Denver-Dillon Vibrating Screen floor mounted, right-hand drive.

● **2-bearing operation of Denver-Dillon Vibrating Screen** reduces power as much as one half. Positive action reduces blinding, makes accurate size separations. Low weight, low h.p. and distinctive patented features give efficient results.

## 1 1/2' x 3' Single-Deck

Bare Screen		Add for 1/2 H.P. motor, motor mounting and drive.	
\$338	Weight 225 lbs.	Price \$89	Weight 108 lbs.

## 1 1/2' x 3' Double-Deck

Bare Screen		Add for 1/2 H.P. motor, motor mounting and drive.	
\$371	Weight 350 lbs.	Price \$101	Weight 122 lbs.

## 2' x 4' Single-Deck

Bare Screen		Add for 1/2 H.P. motor, motor mounting and drive.	
\$432	Weight 350 lbs.	Price \$101	Weight 122 lbs.

## 2' x 4' Double-Deck

Bare Screen		Add for 1 H.P. motor, motor mounting and drive.	
\$473	Weight 600 lbs.	Price \$117	Weight 135 lbs.

## 3' x 6' Single-Deck

Bare Screen		Add for 2 H.P. motor, motor mounting and drive.	
\$869	Weight 725 lbs.	Price \$150	Weight 170 lbs.

## 3' x 6' Double-Deck

Bare Screen		Add for 3 H.P. motor, motor mounting and drive.	
\$954	Weight 1200 lbs.	Price \$168	Weight 180 lbs.

## 4' x 8' Single-Deck

Bare Screen		Add for 3 H.P. motor, motor mounting and drive.	
\$1402	Weight 1275 lbs.	Price \$168	Weight 180 lbs.

## 4' x 8' Double-Deck

Bare Screen		Add for 5 H.P. motor, motor mounting and drive.	
\$1545	Weight 2100 lbs.	Price \$205	Weight 245 lbs.

All motors are totally enclosed, ball bearing. Mounting is suspended spring type motor plate for suspended drive. (Hinged motor base for floor mounting drive also available.)

## PRICES

Prices are firm through February, March and April 1950. Above prices are f.o.b. Denver or Colorado Springs, Colorado, packed for domestic shipment only. Prices for export are slightly higher and include rugged packing.

## ORDER TODAY

When ordering please advise electrical characteristics. Right-hand machines as shown will be furnished unless left-hand is desired. Screens will be shipped via lowest transportation cost unless otherwise specified.

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# WORLD MINING

The International Department of MINING WORLD

SAN FRANCISCO, CALIFORNIA

APRIL, 1950

## INTERNATIONAL PANORAMA

**ORANGE FREE STATE**—Work on the Number 2 shaft, having an ultimate depth of 4,200 feet, is to be pushed at the Free State Goddard mine when the company's additional financing has been completed.

**LA PAZ, BOLIVIA**—Shipments of tin concentrates to the R. F. C. Longhorn smelter in Texas were 19,312 tons in 1949.

**PHILIPPINE ISLANDS**—Mindanao Mother Lode Mines, Inc., has declared its first post-war dividend.

**NORTHWEST TERRITORIES**—Discovery Yellowknife Mines poured the first gold bricks at its new mill in February.

**ALASKA**—The United States Smelting, Refining and Mining Company was the largest Alaskan gold producer in 1949.

**BRITISH COLUMBIA**—Consolidated Mining and Smelting Company has placed its new low-level haulage system in operation.

**LIBERIA**—Liberian Mining Company, Ltd., pushes construction of railroad, ore handling and port and shipping facilities for transporting 1,000,000 annual-tons of iron ore to the U. S. by 1952.

**FRENCH WEST AFRICA**—Marshall Plan funds in excess of \$337,000 have been used in development of iron ore deposits in the Conakry district.

**JOHANNESBURG**—Native employees in the African gold mines have received a wage increase of 15 per cent retroactive to October 24, 1949.

**TRANSVAAL**—The world famous Premier Diamond Mine has resumed full scale production after being shut down since 1932. The mine has been converted from an open-pit to underground stoping methods, a new underground primary crushing plant has been installed and a new washing plant with a 325,000-ton monthly capacity erected.

**MINNESOTA**—Oliver Iron Mining Company has announced plans for the construction of the first combination sintering and nodulizing plant for taconite concentrates and fine iron ores.

**LONDON**—Results of Britain's general election will mean that her great steel and chemical industries will for the present escape nationalization.

**BELGIAN CONGO**—Geomines Manono tin smelter is producing 200 metric tons of tin per month. It is the only tin smelting company in the Belgian Congo.

**NEW YORK**—United States steel capacity has reached 99,392,800 tons annually, according to late tabulations.

**TORONTO**—Canadian production of steel ingots and castings in 1949 was 3,186,910 tons, a new record high.

**WASHINGTON, D. C.**—E. C. A. has announced contemplated purchases by Austrian importers of \$10,000 worth of ferro molybdenum and \$100,000 worth of ferro vanadium from United States companies.

**NEW YORK**—The price for lead has been reduced to 10½ cents following large imports of European and Japanese lead selling for as little as 9½ cents a pound, duty paid.

**SINGAPORE**—January tin concentrate production was 5,180 tons, a new post-war high.

**LONDON**—U. S. purchases of tin for stockpiling in 1950 may reach 25,000 tons from Malaya, 15,000 tons of Dutch tin and 5,000 tons of Belgian tin, according to latest estimate.

**WASHINGTON, D. C.**—The steel production of Western Europe in 1949 was 46 million tons, a gain of 16 percent over 1948 production.

**PITTSBURGH**—M. A. Hanna Company handled 11,673,000 tons of iron ore in 1949.

**AUSTRALIA**—Wiluna Gold Corporation, Ltd., reports development of large low grade gold reserves at the Mt. Charlotte and Porphyry properties.

**CANBERRA**—Figures released by the Australian Bureau of Statistics show that the total of 15,500 men employed in the Australian gold mining industry in July, 1949, had dwindled to 8,800 by October, 1949. Over the same period the total number of men employed in silver-lead mining rose from 8,100 to 8,200. Total number of persons employed in mining (including coal mining) and quarrying in October, 1949, was 35,500.

**BELGRADE**—The Yugoslav government has requested a new \$25,000,000 loan from the World Bank for purchase of mining equipment, tractors and agricultural machinery.

**LOS ALAMOS**—The Atomic Energy Commission will spend \$100,000,000 during the next five years in permanent building construction.

**WASHINGTON, D. C.**—The Export-Import Bank will lend up to \$100,000,000 to the new Republic of Indonesia for purchase of American industrial equipment, including mining machinery.

**KOREA**—E. C. A. has granted \$1,710,000 to Korea, which will use \$1,287,000 for the purchase of industrial minerals from Japan and \$127,000 for miscellaneous Japanese industrial equipment.

**WASHINGTON, D. C.**—The Department of Commerce has removed export controls on copper, zinc, nickel, fluorapatite, kyanite, mercury, chromite, manganese, and titanium ores.

## Taconite Project to Cost Oliver \$17,000,000

R. T. Elstad, president, announced that Oliver Iron Mining Company, Duluth, Minnesota, will build the first combination sintering and nodulizing plant in Minnesota. It will have a capacity of 1,000,000 tons a year. Taconite concentrates from Oliver's first taconite pilot plant, to be built soon, will be sintered and nodulized in the new agglomerating plant. According to Elstad, "Expenditures of \$17 to \$20 million will be made merely to obtain the facts needed to design the first large-scale commercial plant."

In a plea for stable, consistent, long-range tax policies, Mr. Elstad asked for an end to "soak the mining companies" thinking, and pointed out that these lowgrade taconites from Minnesota are facing competition from the richer and simpler ores of Canada, Africa, and Venezuela. "The portion of new ore that will come from taconites will depend largely on its cost as compared to foreign ores."

## Huge Jamaican Bauxite Project Aided by ECA

Development of Jamaica's bauxite deposits is assured with the advance of \$11,000,000 from the Economic Co-operation Administration to Reynolds Metals Company, a United States firm.

The project will be executed by a subsidiary, Reynolds Jamaica Mines, Ltd., in cooperation with the British and Jamaican Governments. About \$14,500,000 will be involved all told. Reynolds already has spent \$1,000,000 in exploration, drilling and research. Part of the additional funds will be spent in the U. S. to construct unloading facilities at a U. S. port, to handle the ore for the Reynolds Arkansas plant at Hurricane Creek and to build a 12,500-ton self-unloading ore carrier. At Jamaica, a pier and harbor facilities, a drying plant at the mines, a six mile overhead tramway from the drying plant to the port, mining equipment and auxiliary facilities will be installed, taking approximately a year and a half to two years to complete.

Ore in the extensive deposits averages about 50 percent alumina and ½ percent to 2½ percent silica, and can be reached by the stripping of about nine inches of overburden. The low-silica Jamaica ore used with the

*Interested in a*  
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**PUMP?**

*The Dorco* **TYPE W PUMP**  
*for handling*

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# WORLD MINING

Issued as an International

Department of  
MINING WORLD

by American Trade Journals,  
121 Second St., San Francisco,  
California

A Miller Freeman Publication

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Publisher . . . W. B. FREEMAN  
General Manager . . . M. F. HOLSINGER  
Editor . . . G. A. ARGALL, JR.  
Production Manager . . . E. B. HERINGTON  
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WORLD MINING is published the 20th  
of each month as a regular department of  
MINING WORLD and is also circulated  
as a separate section on a carefully con-  
sidered free basis to a selected list of  
management and supervisory personnel  
associated with active mining enterprises  
throughout the world.

high-silica Arkansas ore will make  
feasible mining of large amounts of  
Arkansas ore heretofore considered  
useless.

R. S. Reynolds, Jr., president of  
Reynolds Metals, said the ECA would  
be repaid over a period of 20 years by  
delivery of aluminum metal to U. S.  
stockpiles. The government also has  
an option to purchase up to \$6,000,-  
000 of aluminum over a five year  
period.

## US and Turkey Cooperate In \$50 Million Project

At a cost of \$50,000,000 under an  
Economic Cooperation Administration  
program, the Turkish mining  
firm, E.K.I., and the United States  
manufacturing firm, Koppers Com-  
pany, Inc., will construct a harbor,  
improve mining properties, build coal  
washeries and put in about eight  
miles of railroad near the Black Sea  
port, Zonguldak, about 200 miles  
northwest of Ankara.

E.K.I., which is controlled by the  
government banking organization, Et  
Bank, and the Koppers Company  
have signed a contract providing for  
the latter's supervision of the engi-  
neering and construction work.

Joseph Becker, vice president and  
general manager of Koppers Com-  
pany, Inc., announced equip-  
ment will be obtained in the United  
States, inspected and shipped to Tur-  
key. Koppers will name a director of  
operations aided by seven assistants,  
including a mining engineer, a har-  
bor engineer, four civil engineers  
and a chief accountant.

The harbor construction will con-  
sist of two new docks and a large  
breakwater. The mining improve-  
ment plan calls for new tipples and  
two coal preparation plants. The rail-  
road will have a complete switching  
and transfer station.

Four years will be required to  
complete the project.

## Firm Formed to Develop Quebec-Labrador Iron

Iron Ore Company of Canada, a  
Delaware corporation, has been  
formed to assist in the financing of  
production from the Quebec-Labrador  
iron ore field and will be the  
instrument for raising \$160,000,000 or  
more required for railroad, power,  
docks, mining plant and townships.

Labrador Mining & Exploration  
Company and Hollinger North Shore,  
which have been carrying the ball  
for this development so far, will have  
a vendor interest in the common  
stock of the new corporation, and  
they will draw an overriding royalty  
of a minimum of 25 cents a ton. They  
will also own 75,000,000 tons which  
they can sell themselves, plus a share  
of any additional tonnage found on  
the ground now dealt with, plus ore  
on the ground not dealt with.

Another company, Hollinger-  
Hanna, Ltd., is being organized and  
it will be the Canadian management  
company for the property, receiving  
a fee of 10 cents a ton on shipments  
of iron and on specialties, such as  
iron-manganese ore and manganese  
ore.

Hollinger Consolidated, which did  
most of the exploration and develop-  
ment, will have a 50 percent interest  
in the management corporation.

One interesting feature is that five  
U. S. steel companies—of which two  
are Republic Steel and Youngstown  
Sheet and Tube—and the Hanna Coal  
& Ore Corp. plan to buy ore in  
sufficient volume to warrant the ob-  
jective of 10,000,000 tons a year pro-  
duction, and they will assist in com-  
mon stock and debenture financing.  
Thus, the development is assured of  
customers.

## Russia's High Grade Iron And Steel Dwindles

The southern Ural Mountains have  
been the major source of high grade  
iron ores in Russia for many years  
and the region is considered com-  
parable to the Mesabi Range in the  
United States. However, in Moscow's  
paper Pravda, an article appeared  
recently written by G. Nosov, director  
of the huge iron and steel combine at  
Magnitogorsk, stating that the high  
grade ores are practically exhausted  
and that companies in the region will  
be forced to find ways of exploiting  
the enormous reserves of low grade  
ores. In 1940 a Russian economist re-  
ported that 11,000,000 tons of poor ore  
lay discarded in dumps throughout

the Urals and has not been processed  
due to lack of facilities and equip-  
ment. Millions of tons of the same  
grade lie in the earth.

In order to supply the increased  
demands for iron and steel in Russia  
today, old methods of refining high  
grade ore must be revised to take  
poorer grades and as fast as possible.

Mr. Nosov says that machinery  
builders have not kept up with the  
needs of the metallurgical industry  
and that new technical developments  
barely have been incorporated into  
new equipment. Besides, deliveries  
are very slow. The quality of coking  
coal also is extremely poor.

Although the situation was fore-  
seen more than 10 years ago, its  
solution has not had the consideration  
warranted—in fact, surprisingly little  
effort has been expended to resolve it.

## New Wemco H. M. S. Plants Operate in Belgium

The first "heavy-media separation"  
coal washing-plant manufactured by  
Western Machinery Company to be  
used in Europe was sold in 1948 to  
Charbonnages d'Hennessy-Pommeroy  
(Belgium). It is a 3-C mobil-mill  
treating 50 tons per hour ROM coal  
and began operating in May 1949.

Because of the results obtained by  
use of this pilot-plant, the same col-  
liery has ordered two more which will  
also be manufactured by Western  
Machinery Company at San Fran-  
cisco, California. The first plant will  
treat 200 tons per hour of one-fourth  
inch by three and one-fourth inch  
ROM coal and the second one will  
treat 100 tons per hour of 16 mesh-  
one-fourth inch ROM coal. The larger  
plant will be a twin-cone mill pro-  
ducing coal and middlings.

The Agence Miniere et Maritime  
S.A., 2, rue Van Bree, Antwerp, acts  
as agent for Western Machinery.

## New Extraction Processes Used in Queensland Mines

Mt. Morgan, Ltd., is investigating  
the production of sulphur from py-  
rites by the Orkla process. This  
process was developed in Norway  
and used also at Rio Tinto, Spain  
and San Domingos, Portugal. H. R.  
Potts, metallurgist from Rio Tinto, is  
directing the experiments.

At Mt. Isa Smelting Company sub-  
stantial improvements in overall  
metal extraction have been made  
following the introduction of a new  
process, according to Chairman  
Julius Kruttschnitt. The method in-  
volves treating the flotation feed with  
gaseous sulphur dioxide. Lead re-  
coveries have increased by 10 per-  
cent, silver by 11 percent, and zinc  
by five percent. The possibilities of  
conditioning the flotation feed had  
been revealed by the local laboratory  
staff, but the application had been  
carried out only after the arrival of  
a U. S. flotation expert.



Left: Field crew at Mt. Lyell, Tasmania. The party is working in an area of shallow soil. Geochemical surveys made in this area were in agreement with separate surveys made by other geophysical methods. Right: Trench at Cape York, Queensland, from which samples of soil were taken and analyzed for lead.

## GEOCHEMICAL PROSPECTING METHODS BRING RESULTS IN AUSTRALIA

By Dr. V. P. Sokoloff

In 1948, the writer engaged in research involving developments of applied geochemistry in some mining districts in Australia. The work was sponsored by the Zinc Corporation, Ltd., the Newmont Mining Corporation, the St. Joseph Lead Company, and the Australian Commonwealth Bureau of Mineral Resources. The work was resumed in 1949, under the sponsorship of Western Mining Corporation, Ltd., and of the Bureau. The results here presented, in a generalized form, are used by permission of the Zinc Corporation, Ltd., and the Western Mining Corporation, Ltd.

### Many Australian Projects

The first detailed project in Australia was in the Wallaroo-Moonta copper mining district, South Australia. There followed a number of short orientation studies, in different

parts of the Commonwealth, including a copper dispersion study in Wollagorang, Northern Territory, in the Australian tropics. Projects were located in different types of climate and terrain, in every state of the Commonwealth, with the exception of Western Australia.

In 1949, time was spent in the Western Australian gold field, with headquarters in Kalgoorlie, in a basic study of the dispersion of gold in rock and soil. This period was followed by a short study on Viti Levu, Fiji Islands, by invitation of the Loloma-Emperor Mines, at Vatakoula Mines, where the gold mineralization is very similar to that of Cripple Creek, Colo.

In the meantime, some colleagues and associates of the Commonwealth Geochemical team organized in 1948 had undertaken projects of their own, following the techniques and the philosophies previously developed. Some of these later projects, notably those of the North Broken Hill Pty., Ltd.,

and the State Department of Mines, New South Wales, have led apparently to significant results.

A geochemical exploration team was usually made up of four geologists. The main objective was to gain ex-



Jackhammer and crew used in sampling at Wallaroo-Moonta, South Australia, prospecting for copper.



Dr. Sokoloff has a B.S. degree (1928) from the University of Arizona and a Ph.D. from the University of California (1937). From 1938 to 1937 he worked for the U. S. Department of Agriculture's Bureau of Plant Industry. Their studies of boron in soils and water, and its effects on California plants were among the first successful geochemical studies. From 1943 to 1950 Dr. Sokoloff worked for the U. S. Geologic Survey. During the war with a Military Geology unit in the Pacific. After the war an applied geochemical studies in the United States. Dr. Sokoloff is now working at the Isaac Bowman School of Geography, Johns Hopkins University.

perience in new testing procedures, in setting up field base type laboratories, and to develop a common language and philosophy of applied geochemistry. State geologists, mining company geologists, university men, engineers, chemists, and other interested persons, joined the team at different project sites, to cooperate in the exploration and to instruct the team in local geologic and mining problems.

### Western Australian Gold

My purpose is to give a brief account of the Western Australian work, as an example of the application of

geochemical prospecting in modern Australian exploration.

Dispersion of gold in soil and rock was the main topic of the investigation. Development of a rapid and sensitive test for gold was a prerequisite of the dispersion studies. A prospecting application of the test was a reasonable consequence of the two.

Conclusions and illustrations here presented are generalized, with the necessary omission of the locality names. Samples were cut at regular intervals along the walls of underground crosscuts, samples of diamond drill cores were obtained and samples of weathered rocks were collected from a series of surface trenches. All samples were then tested in the laboratory and the distribution of gold was plotted on a sampling grid with results shown in Figure 1.

Discontinuous bands of gold-positive rock were observed in all diamond drill cores so far examined. The width of these bands appears highly variable on the sampling grid. Their linear distance from the nearest economic lode may be tens or hundreds of feet. The bands contain enough gold to yield positive indications, by the Kalgoolie gold test. There is no correlation between mineral composition of the rock and the gold indications.

The above-described pattern was observed both in the oxidized and in the reduced zone cross-cuts, in an underground traverse through a part of the district (at about the 900' level), and in inclined drill holes. Similar patterns were observed in trenches dug in weathered rock, more than 1500' away from the nearest known target.

Diffusion of traces of gold into walls of the lode channel would result in a reasonably continuous anomaly in the rock that could be termed a "gold halo." Suggestions of such diffusion

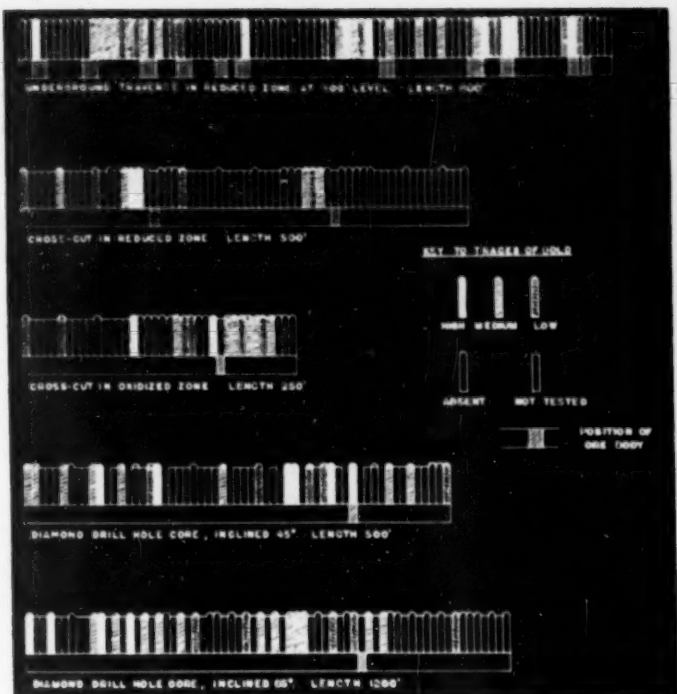


Figure 1. Distribution of gold in rock with respect to known lodes.

are indeed present, locally Figure 1. The linear extent of the diffusion is very small, however. Some lodes are entirely devoid of the halos. Rock within a few inches of the lode may be gold-negative.

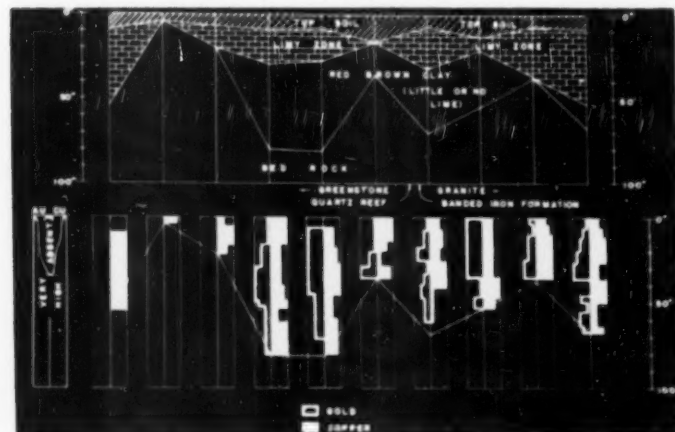
The gold-negative bands are probably the trace analogues of economic

lodes. Their position is due probably to microstructures in the rock, to a network of miniature cracks, fissures, and interplanar weaknesses. The true continuous halos apparently are either non-existent or unimportant, in the district, despite the relatively high pressures and temperatures that had apparently accompanied the mineralization of the volcanic greenstone. The gold-positive bands could be termed perhaps a discontinuous halo of the lodes. If so, they may be regarded as true prospecting indications recognizable hundreds of feet away from the targets which they represent. It is curious that the bands appear to be somewhat more prominent in the economically poorer drill cores than in the richer ones. The data are still insufficient to permit a thoroughly valid interpretation of the gold-positive bands. It is not impossible that they are representative of the geochemical background of the district as a whole. If so, the former interpretation stands in need of revision, as additional data continue to accumulate.

#### Weathered Mantle

Gold tends to accumulate in the products of weathering of auriferous rock, under certain conditions. This accumulation is conspicuous in natural residual soils overlying parts of

Figure 2. Geochemical expressions over a known major lode. Gold and copper concentrations are plotted as to position and depth in a weathered soil zone.







Upper left: Field camp for exploration party at Cape York, Queensland. The open country with little underbrush made trenching and soil sampling much easier than in the South Victoria jungles. Upper right: Trenching for samples to be analyzed for copper at Wallagorang, Northern Territory. Native labor was employed whenever possible. Lower left: Examining residual soils at Cafar, New South Wales. Prospecting in this area was for copper mineralization. Lower right: Casing a hole made with auger during copper sampling operations at Wallara-Mounta, South Australia.

the district. Interest in this connection is in the extremely small particles of microscopic and possibly sub-microscopic dimensions and in the ancient soil profiles rather than in their modern derivatives. A typical gold anomaly in a residual soil over a major lode is shown diagrammatically in Figure 2.

Geochemical expression of known lodes was found both in the gold anomalies and in the soil log. The gold background in the ancient residual soils was practically zero. Thus, the prospecting criteria were established tentatively, for certain types of terrain in the district, and a reconnaissance of several square miles of the country was carried out, on a reasonably spaced grid.

Several gold anomalies and a buried outcrop of gold-bearing rock were discovered by geochemical prospecting. The area of initial interest was reduced to about 1/10th its former size, permitting a more detailed geophysical and geologic study of the potential prospecting target. Such detailed studies were not feasible economically, in the absence of the geochemical grid. It may be stated, however, that the geochemical prospecting appears to be a most rapid and a least expensive method of sorting out the promising from the unpromising parts of certain types of terrain, where the older and the established exploration methods, geology and geophysics, cannot be conveniently used for the same purpose.

#### Interpretation

The technical components of geochemical prospecting are not difficult to maintain at a reasonable level of serviceability. Presence, size, and intensity of geochemical anomalies are easily established in most terrains. Interpretations of the anomalies

are by no means easy or certain, however. This uncertainty is illustrated in Figure 3.

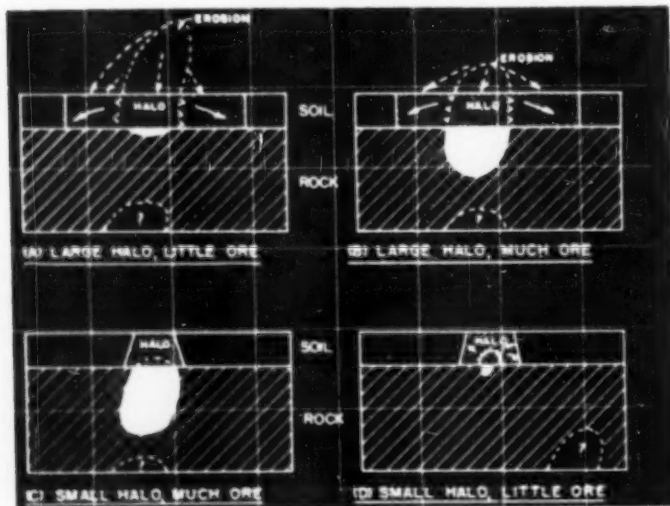
Position of the present erosion surface with respect to the potential target represented by the anomaly is probably decisive in determining the economic significance of the anomaly.

There is no absolutely reliable method of ascertaining the erosion surface-target relationship. Vestigial anomalies representing targets destroyed and dissipated by erosion are likely to be found in many kinds of terrain. Depending on the more or less accidental position of the erosion surface with respect to the target, large anomalies may mean much ore or nothing and small ones, nothing or much, including necessarily the intermediate possibilities. Finally, some conceivably accessible targets may not be represented by any anomalies at all, depending on the manner in which the erosion had cut the rock and also on the mode of the mineralization.

These general considerations are sufficient to restrict the usefulness of geochemical prospecting. Not all ore bodies are associated with anomalies.

If, however, a geochemical anomaly is associated with other indications, its prospecting significance is enhanced thereby. Subsequent geophysical (magnetic) and geological investigations have sustained some geochemical anomalies. One may reason perhaps that where the economic source of the anomaly has been largely dissipated, there may be repetitions of the ore body in depth.

Figure 3. Four hypothetical cases showing size of "gold halo" in residual soil in relation to size of corresponding orebody.





Left: That the small 1½" nozzles do a good job is shown in this picture. Under pressure ranging from 100 to 200 lbs., this gun is cleaning ore from a taconite wall. The reddish, sludge-laden water is seen running down the bank in the foreground. Right: To show the manner in which the last crumbs of ore are recovered from the open pits, some of the Mesabi Range mines employ hydraulic nozzles. This scene shows a nozzle cleaning fine ore from a taconite bank.

## HYDRAULIC SCRAMMING OF IRON ORE RESULTS IN NOVEL APPLICATION IN MESABI MINES

By E. S. Tillinghast

Correspondent, *Mining World*  
Hibbing, Minnesota

A novel application of moving material by hydraulic methods is being employed in some of the open pit mines of the Hibbing, Minnesota, district where it has been in use for about four years.

After an area has been cleaned as well as the usual uneven taconite bottom will permit by shovel, dozer, or scraper and, perhaps, with some hand work, the hydraulic method is applied to make a completely finished job.

Water is supplied through a 4" pipe line to two 2½" hoses, approximately 400 gallons per minute at a pressure of from 100-200 lbs. The two hoses come together at the nozzle carriage where a 1½" nozzle is pivoted so that it may be directed wherever desired. In some cases, the nozzle is carried on a two wheeled, rubber tired carriage. In others it is mounted on a stone boat. The latter is better for very rough ground where it is dragged around by a tractor or shovel and where the wheeled carriage would be difficult to handle.

The areas that are cleaned by this method have a taconite bottom and the ore that is left on them is sluiced to a low basin from which it is afterward loaded out by regular mining equipment or by hand, depending on the quantity of washed material to be handled.

The method also is used to clean narrow channels of ore which sometimes extend for some distance with

a rock wall on each side. Frequently, the channel is too narrow for a small shovel, dozer, or scraper to operate and, in such cases, the hydraulic system is quite effective. Bottom areas and channels that have been cleaned in this way are swept clean of ore in the same way that a good housewife's freshly scrubbed kitchen floor is free from dirt. There is no ore left.

The method would not be feasible in a pit that bottomed in soft material

that was of too low a grade to be absorbed in the mine's shipments. This is sometimes true, particularly in wash ore mines at the west end of the Mesabi range, but when the bottom is hard taconite and where a thorough clean-up is necessary or desirable, this hydraulic method leaves nothing to be asked by even the most strict of inspectors.

Whether or not the ore obtained by the method is commercially profitable may be open to question. But where a careful clean-up is required as a conservation measure, it recovers that last small percentage of ore that would otherwise be lost.

Cleaning ore from loose rock at a mine in the Hibbing district. Here the nozzle is sweeping finely broken ore from the taconite bottom and the face of the bank.





Fairbanks Exploration Company's Dredge No. 2 operating on lower Goldstream Creek in the Fairbanks district. It is a connected bucket line dredge with 10 cu. ft. buckets. This picture was taken before the dredge had dug all available gravel, necessitating moving day.

## ALASKAN MOVING DAY

**1910 ton gold dredge cut in four sections and hauled 20 miles overland by tractors**

Dredge No. 2, of the Fairbanks Exploration Co., a subsidiary of the United States Smelting, Refining & Mining Co. has been operating at Goldstream in the Fairbanks district since it was built in 1927 and 1928 by the Bethlehem Shipbuilding Co.

Early in 1948 plans were made to move the huge gold dredge overland to the Company's operation at Fairbanks Creek, 20 miles from its site at Goldstream. The Company's previous experience in moving dredge No. 6 in 1927, and dredge No. 5 in 1947 were utilized to the fullest extent and a road approximately 100 feet wide with maximum grades of 19 percent, was cleared and bulldozed in preparation for winter hauling.

The dredge, 128 feet in length, by 60 feet in width and with a hull 12 feet deep, and a displacement of 1,910 tons, was cut into four sections and the stacker, ladder, gantry and other accessories were removed and moved separately to Fairbanks Creek. Butt straps were welded in place and drilled as guides for reassembly before cutting the dredge into sections.

Special steel sleds were designed by the Company's mechanical dept. at Fairbanks and built by The Hydraulic Supply Co. of Seattle. Friction of the sled runners, carrying the 146-ton

sections, thaws the snow-covered ground, but the cold weather freezes the runners fast whenever a stop is necessary. Enclosed multiple nozzle heaters, burning Flamo gas, were built in the Company shops and mounted on the tips of the runners for thawing the sleds free after every stop.

All motive power is supplied by an Allis Chalmers HD-19 and a Caterpillar D-8 tractor pulling in tandem on direct pull assisted by two D-8's pulling down hill through snatch blocks anchored at the tops of the grades.

At the end of the long haul, the sections will be re-assembled and the hull again riveted and welded together using the previously drilled butt straps for re-alignment.

The men directly in charge of operations are: Barr S. Ashurkoff, chief engineer; J. D. Crawford, dredge supt.; William LaFon, dredge master; and Ralph Norris, master mechanic.

The overland journey is reported to be progressing satisfactorily, and the dredge is scheduled to be re-assembled and back to work digging gold bearing gravel in its new location on Fairbanks Creek after the spring thaw.

Top left shows off hull sections undergoing preparation for the start of the haul to Fairbanks Creek, twenty long miles away. Center left, the forward starboard hull section is mounted on heated steel sleds. Bottom left, an Allis-Chalmers MD-19 and a Caterpillar D-8 hauling the forward hull section, with the aid of two more D-8's pulling 1 1/2" cables through single snatch blocks. Bottom right shows the forward starboard hull section ready to be moved up grade to top of hill. Forward port section approaching the top of the hill in background. The two small dark spots in the road are the two Caterpillar D-8's hauling downhill through snatch blocks.



Newly-elected officers of the Minnesota section of the American Institute of Mining and Metallurgical Engineers are, left to right: C. J. O'Connell, Minneapolis, chairman; Grover J. Holt, Ishpeming, Michigan, and L. M. Scafield, Duluth, vice-chairman. They were elected at the Section's annual meeting held in Duluth on Jan. 16.



## Advances in Iron Mining and Milling Reported at Duluth Sessions

Expansion of iron ore mining in the Province of Ontario, Canada, excepting for any new discoveries in areas covered by glacial drift or water, will depend on the utilization of deposits requiring beneficiation was the opinion expressed by M. E. Hurst, Toronto, provincial geologist of Ontario, at the 23rd annual meeting of the Minnesota section of the AIME, held January 16 in Duluth, Minnesota. The sessions were attended by over 300 Minnesota, Wisconsin and Michigan mining men.

Mr. Hurst said iron ore surface exposures have been thoroughly prospected. The chances of finding large concentrations of high-grade iron ore would appear to be restricted to areas covered by water or drift.

The sequence of development and exploitation of deposits which need beneficiation, will depend on a number of factors such as location, size, grade, transportation and power facilities, distance from market, amount and type of beneficiation required and desirability of the finished product. Among the deposits in this category are those consisting of high-sulphur magnetite or hematite, titaniferous magnetite, siliceous iron formation and magnetite-bearing syenite gneiss, Mr. Hurst said. In the aggregate such deposits probably exceed a billion tons but further investigation and testing will be needed to determine their individual and relative suitability for development.

### Ontario Iron Ore Mining

Iron ore mining in Ontario dates back to the year 1800 but the total amount of ore mined during the next 100 years probably did not exceed a quarter of a million tons.

From 1900 to 1923 when the Helen,

Maggie and Moose Mountain mines were in operation Ontario's iron ore production rose to about 4,500,000 tons. Iron ore mining was resumed in 1939 and the foundation now has been laid for a long-term period of production.

In the past 11 years Algoma Ore Properties and Steep Rock Iron Mines, Inc. have together produced over 10,000,000 tons or roughly two-thirds of all the natural beneficiated ore mined in the province during the last 150 years.

At the present time the Steep Rock mine is the only source of shipping grade ore in Ontario. The combined reserves of the B orebody, which is currently in production, and the A orebody, which is being stripped of overburden, are estimated to be in excess of 14,000,000 tons per 100' of depth. Preparations are being made to more than double the 1949 output of 1,130,000 tons. The area containing the C orebody, on which only preliminary exploration has been done, has been leased to the Inland Steel Company of Chicago.

Of the low-grade deposits readily amenable to beneficiation none gives greater promise of profitable, long-term production than the siderite bodies of the Michipicoten area. Facilities have recently been installed by the Algoma Ore Properties to increase output of sinter to a million tons per year. The known siderite occurrences in this area have indicated reserves of at least several hundred million tons.

### Problems of Mine Drainage

Wilbur T. Stuart, Ishpeming, Michigan, U.S. Geological Survey Engineer, told the group that after three years of work on mine drainage

it is apparent to him that no one method or even combination of methods can be economically applied to eliminate all the ground water in mine workings.

Each problem requires separate study and solution. Some properties may be effectively unwatered by pumping from glacial overburden. In others where surface pumping is not economical, properly located water interceptor drifts may control the water so that drier ore may be mined with less risk from water hazards.

Water volume in some of the mines in the Iron River district of Michigan is excessive and a number of mines have been abandoned because of water.

Iron River district mines handle water by underground pumps and surface deep-well type pumps. The latter captures water before it enters the mine workings.

Cost of pumping water in some wet mines is more than 30 cents per ton of ore. In some instances more than 35 tons of water have been pumped for every ton of ore mined.

### Economic and Human Engineering

A. C. Daman, President of the Denver Equipment Company, Denver, Colo., in a discussion of economic and human phases of mine engineering, urged as a means of combating Communism, ownership in part of America by everyone, encouragement of the incentive system, greater social security for everyone, and more progressive ideas to show the advantages of the private enterprise system.

Mr. Daman gave this advice to the engineers:

"Pick an employer who is making an adequate profit and help him to continue to make that. No matter



Prominent speakers at the Minnesota section, A.I.M.E. meeting included, left to right: W. L. Taylor, Hibbing, Minnesota, the Section's retiring chairman; Thomas McCabe, Duluth engineer, and W. E. Hurst, Toronto, Canada, provincial geologist of Ontario.

what you are, no matter how much knowledge you may acquire, no matter how successful you may have become in your work, you can rarely if ever become a great success unless you acquire the ability to pass your knowledge on to others and get them to work with you in the development and production of your ideas—in other words you must be human."

Thomas McCabe, Duluth, Minn., attorney, told the delegates that pension plans now being set up in the Lake Superior mining district as the result of agreements reached last autumn by the CIO-United Steelworkers union will be major cost items.

There are two kinds of plans, one known as a "Self-Administered" plan and the other as the "Insured" plan.

The general procedure for setting up a plan under the self-administered provisions are to: Employ an actuary, make your estimates of past services and future services based on mortality tables and then determine the capital reserve necessary. To this add the cost of the actuary's fees, legal services, administration costs and costs of administering claims. In the insured plan, the insurance company would make the estimate and determine the costs.

Under both the welfare clause and the setting up of pensions, specifications should be drawn to meet union requirements, and that any actuary making estimates for the self-administered plan should be required to follow the requirements of the union contract and the specifications laid down by the company.

After receiving the cost estimates for both the insured and self-administered plans, the company would be in a position to determine which of the two plans would be least expensive and the most flexible in administration. Welfare plans if set up under a trustee agreement must meet the requirements of the Taft-Hartley law and provisions of the internal revenue code.

#### Newly Elected Officers

Officers elected for the ensuing year

are: C. J. O'Connell, Minneapolis, chairman; Grover J. Holt, Ishpeming, Mich., L. M. Scofield, Duluth, and Hugh Leach, Marble, Minn., vice chairmen, and D. M. Davidson, Minneapolis secretary-treasurer. Chosen directors were: R. W. Whitney, Hibbing, Minn., E. P. Scanlon, St. Paul, Minn., and W. L. Taylor, Hibbing, Minnesota.

#### University of Minnesota At Mining Symposium

Most of the delegates remained in Duluth to attend the 11th annual symposium held on Jan. 17 and 18.

Fred D. DeVaney, Hibbing, research metallurgist for Pickands, Mather and Company, in a paper titled "Flotation of Lake Superior Ores" pointed out that flotation offers a possibility of concentrating many of the ores in the Lake Superior district. It is very probable that a number of flotation plants would now be in operation but for one fact—flotation concentrates are fine and the blast furnace operators rightly do not wish to put such materials in their furnaces. The adoption of flotation has, therefore, been retarded, not by its cost or lack of effectiveness, but by the lack of cheap and effective methods of pelletizing or sintering concentrates, he said.

Mr. DeVaney added: "We believe that with the development of such processes—which now seems imminent—flotation will soon find a place in the concentration of Lake Superior iron ores."

T. L. Joseph, Dean of the Mines and Metallurgy School, University of Minnesota, said that a study showed 1,084 pounds of Lake Superior district iron ore were consumed annually per capita for the years 1914-1929. This figure fell to 370 pounds for the decade from 1929 to 1933, but from 1940 to 1950 the annual per capita consumption rose to 1,290 pounds as a result of the war and pent up demand immediately following it.

Barring depressions and wars it appears that our annual need for lake ore is on the order of one-half ton per year per capita, he said. With a popu-

lation approaching 150,000,000, our current need for lake ore appears to be about 75,000,000 tons per year. Per capita requirements may change slightly in the future, but a constantly expanding demand for iron ore must be met to maintain the American standard of living.

#### Pelletizing Furnaces in Operation

Dr. E. W. Davis, Minneapolis, director, Mines Experiment Station, University of Minnesota, told the group that a great deal more is now known about the mechanical problems involved in the operation of the pelletizing furnace and auxiliaries, but in the attempt to get pelletizing equipment into steady, continuous commercial operation it has been necessary to neglect fundamental studies to a certain extent and concentrate on the details of making the process work.

Dr. Davis said, "We still must make actual tests to determine whether or not any given material can be satisfactorily hauled for pelletizing purposes. Research is continuing in this field, however, and, undoubtedly, the controlling factors will be discovered at some later date."

At the present time there are three furnaces, in addition to the one at the University of Minnesota, that have been in operation on a tonnage basis. They are: the furnace at the Erie Taconite plant, near Aurora, Minn., a combustion-chamber type; the Reserve Mining Company's furnace at Ashland, Ky., straight-shaft type without combustion chambers, and the furnace of the Bethlehem Steel Company at Lebanon, Pa., which is a combination type—most of the heat being generated within the furnace shaft by the oxidation of the magnetite and added carbon, but a part is added through combustion chambers. The University of Minnesota furnace is of the straight-shaft type but it is continually being redesigned and rebuilt to test out different ideas.

#### Bethlehem Steel Explores Colonial Magnetite Area

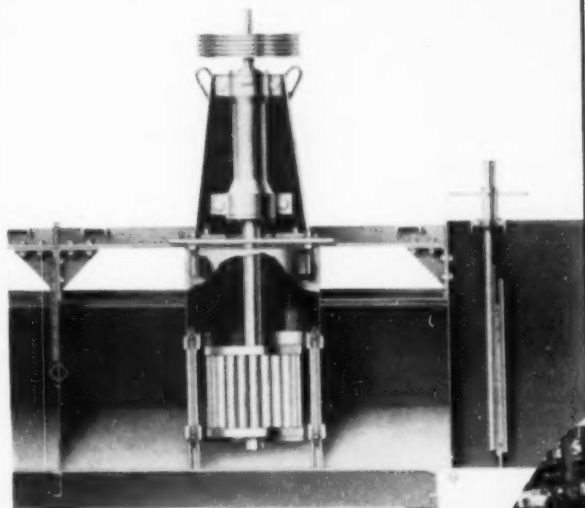
The Bethlehem Steel Company recently purchased a tract of land near Morgantown, Pennsylvania, to investigate by diamond drilling magnetometer indications of commercial iron deposits. The airborne magnetometer survey which pointed to the new area was conducted over a belt of Triassic sediments and diabase intrusions in the southeastern part of Pennsylvania to find magnetite deposits of the Cornwall type—which were not indicated by surface geology.

Sprague and Herwood, Philadelphia engineering firm, is diamond drilling the Morgantown area for Bethlehem. The Morgantown deposits are a part of an iron producing belt which supported the iron industry of colonial days. Bethlehem, working in a changing iron economy, may revive this ancient iron belt.



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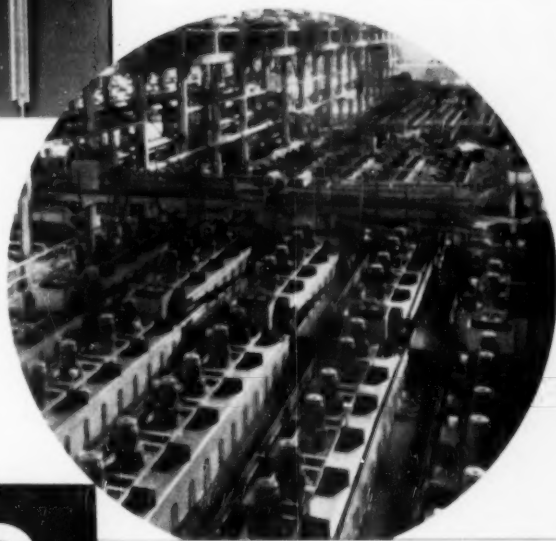
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## PROMINENT MEN IN INTERNATIONAL MINING

Henry N. Lightbody, mine manager of the Rhodesian Iron and Steel Commissions' iron ore, limestone, fluorspar and dolomite deposits at Que Que, Southern Rhodesia, has been appointed manager of the Kalembe mine, in Uganda, and has left to commence his new duties.

G. A. R. Mellisham is now mining engineer for the British Guiana Consolidated Goldfields.

F. A. Louinger, C.B.E., has retired from the chairmanship of the International Tin Research & Development Council. He will be succeeded by G. F. A. Burgess, a joint managing director of the British Metal Corporation, London.

G. J. Brettingham has severed his connections with the Electrolytic Refining and Smelting Company of

and to the Empire and allies during the two world wars.

Eslington Lewis resigned his position of chief general manager for Broken Hill Proprietary Ltd., Australia, and takes a position as director and chairman. Colin Syme became deputy chairman; Norman Jones, chief general manager; and Ian Mc-Lellan, general manager.

D. D. Irwin, of Chicago, Illinois, will be joined by R. L. Prain, managing director of the Roan Antelope Copper Mines and Mufuhira Copper Mines in Northern Rhodesia, Africa, on a visit to these properties, stopping at O'okiep and Tsumeb en route.

A. L. Reading has been appointed president and managing director of a new Alberta corporation, Horizons, Ltd., with offices at 516 Burns Building, Calgary, Ontario, Canada, and operational headquarters at Georgetown, British Guiana. Wallace E. Wade is the mine superintendent of the initial operation which is a placer project. Reading will, for some time, be engineer in charge of field operations.

Edward H. Brinley has taken a position as an assistant geologist with the Andes Copper Mining Company, Potrerillos, Chile.

Gordon Cargal is now with the Union Commerciale France Vietnam, Haiphong, French Indo-China, after spending the past year in Sydney, Australia, as foreign representative for The Jeffrey Manufacturing Company.

James Strang was recently retired from his position as British Columbia's chief inspector of mines. Ham-

ilton Cleaver Hughes will succeed Strang.

Victor M. Lopez has changed the address of his consulting office at Caracas, Venezuela, to Apartado 2633. He is associated with various Venezuelan and North American engineers, associations and companies.

Eduard A. Malmberg was recently appointed sales engineer for the Export Division of Euclid Road Machinery Company, Cleveland, Ohio, and assigned to the Far Eastern territory including Indonesia, Malaya, India, Pakistan, Siam, China and Japan.

**BENJAMIN L. JOHNSON**, former assistant general manager for Braden Copper Company in Chile, has been appointed vice president in charge of operations at Caquipes, Guatemala, for Compania Minera de Guatemala, I. K. Reyna has been in charge of operations since their inception, and will now become executive vice-pres.



Eduard P. Leach will succeed Leonard C. Yancey as vice-president and manager of Bethlehem Chile Iron Mines Company. Yancey will manage the property of the affiliate, the Iron Mines Company of Venezuela, after construction has been completed.

Hollis I. Conner will make a three months tour of the Caribbean area before assuming his new position as assistant manager of the export division of the Hyster Company of Portland, Oregon. He will headquarter in Peoria, Illinois.

Joseph M. Viener has been requested to serve as a member of the National Minerals Advisory Council during 1950 by Oscar L. Chapman, Secretary of the Interior.

Norman C. Urquhart, C.B.E., has been appointed president of The Mining Corporation of Canada Ltd., succeeding J. H. C. Waite, deceased. H. L. Roscoe was appointed vice president and James Y. Murdoch to the board of directors. Roscoe also was named president of Quemont Mining Corporation, Ltd. and of Normetal Mining Corporation, Ltd., subsidiaries of the Mining Corporation. Urquhart was added to the boards of both of these companies. J. A. H. Paterson was named president of Torbrit Silver Mines and Urquhart was made vice president. Torbrit is another subsidiary of M. C. of C.

Felix E. Wormser, vice president of St. Joseph Lead Company, has been elected president of the Mining and Metallurgy Society of America. James L. Head, resident mining engineer of Anaconda Copper Mining Company, was made vice president.

Continued on Page 39



of the industrial and mining centers of that country.

R. PETERS, technical consultant for the Kingdom of Saudi Arabia, has recently returned to his headquarters in Jeddah, S. A., after a trip to Japan and the United States on business for the Saudi government. While in Japan, Peters made a survey

Australia and will enter private practice as consulting metallurgist.

John E. Harper, upon his return to Northern Rhodesia, will assume a position in the concentrating department of the Roan Antelope Copper Mines Ltd. at Luanshya.

K. C. Maithal has become an agent for the Christian Mica Industries, P. O. Domchanch, District Hazaribagh (Bihar), India. Previously he was the chief mining engineer to the Bogala Graphite Ltd., Colombo.

D. Hutchinson has been made mine manager of S. A. Minerals Corporation, Rustenburg area, South Africa.

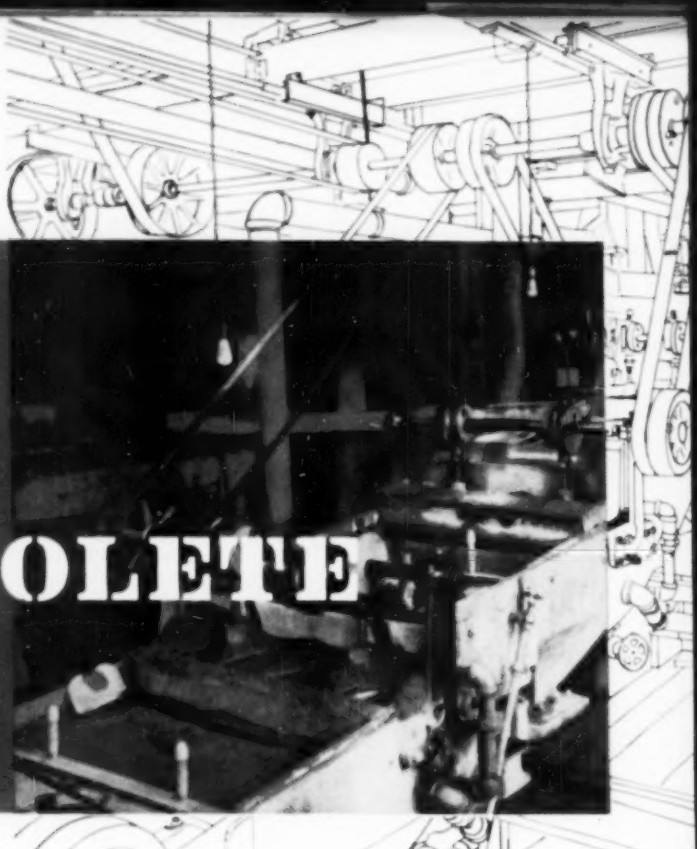
I. D. Mead has resigned from the board of directors of Tanjong Tin Deeding which has properties in Malaya. John T. Chappel takes Mead's place in the London office.

Noel B. Morphy has been made manager of Oceana Consolidated Company Ltd.'s Honeybird Asbestos mine, Shabari, Southern Rhodesia.

W. S. Robinson has been awarded the Australian Institute of Mining and Metallurgy's 1949 medal which recognizes the distinguished services to British Commonwealth and Australian gold and base metal mining



ROGER V. PIERCE, Salt Lake City, Utah, has been appointed special mechanization consultant for the copper properties of the Matamboro Minas de Pinar del Rio in Cuba.



# LEAD-ZINC FLOW SCHEMES GROW **OBSOLETE** TOO!

## Read How 7 Mills Modernized Milling Practice to Increase Operating Profits

Vanners, tables and jigs served well as primary milling methods only to be superseded by more selective, more efficient chemical flotation. By the same token, traditional lead-zinc reagent combinations are themselves being obsoleted by technical progress and economic change.

Many metallurgists find that substitution or addition of the newer Cyanamid reagents produces higher grades, lower tails or both. Others find that modified combinations of older reagents in new

flow schemes can offset rising costs or lower-grade mill feed. All started with an open mind . . . realizing that as the list of new reagents grows, possible combinations are as many and varied as ore bodies, operating conditions and competitive situations in the base metal industry.

Typical of what can be done are these abstracts from among the many examples of progressive base-metal beneficiation in Cyanamid Mineral Dressing Laboratory records:

**ARIZONA** Profitable operation of a 100-ton-per-day mill treating a lead-zinc-gold ore in Arizona was achieved when the correct reagent combination was found for the large percentage of oxidized lead ore in the mill feed. In obtaining a concentration of the sulphide and oxidized lead minerals, AEROFLOAT<sup>®</sup> 31, cresylic acid and soda ash are added to the ball mill. Thiocarbonyl 130 and xanthate, added to the sulphide lead rougher cells, are used as sulphide lead promoters. To the tailing from the sulphide lead cells 3 lbs. per ton of Reagent 425.04 lbs. per ton of xanthate and large amounts of sodium sulphide are added. From feed containing 1% sulphide lead and 10% oxide lead, a combined lead

concentrate is made assaying 60% Pb with a tailing of 1.5% Pb. Overall recovery is 82%, with 16% of the lead in the sulfide concentrate and 66% in the non-sulfide concentrate.

Further testing in the field has shown that, by adding Reagent 425 to the ball mill, recovery in the sulphide concentrate can be increased to 25%, and recovery in the non-sulphide concentrate to 67%—making an overall recovery of better than 90% with no loss in grade. These results confirm other tests, tending to prove that lead recovery is increased if the slined particles are coated with reagents as soon as formed.

**IDAHO** At a large sulphide lead-zinc flotation mill, extensive tests have been conducted over the past two years to determine the best reagent combination. As a result, the following combination has been adopted in place of reagents formerly used:

Pb Circuit	Zn Circuit
AERO Brand Cyanide	Cresylic Acid
Zinc Sulphate	Copper Sulphate
AEROFLOAT 31	Sodium AEROFLOAT "B"
Cresylic Acid	

Recoveries are improved and grade of zinc concentrate has increased from 16% to 32% Zn.

**CANADA** The presence of mica is not often a problem in a lead-zinc-silver ore but it made maintenance of lead concentrate grade erratic at this 550 ton per day Canadian flotation plant. Ore contains 1.2% lead; 5% zinc and 2 ounces of silver. Grade varied from 15 to 70% Pb, depending on the amount of mica floating with the lead. Tests with various traditional and new reagents showed that the use of only .04 lbs. per ton of Reagent 620 in the lead cleaner circuit would depress the mica and stabilize grade at 60% Pb with excellent lead recovery. Because the mica can now be separated from lead successfully through the use of Reagent 620, mica is a potentially marketable product, instead of a source of trouble.

**ARIZONA** At this lead-zinc property two classes of ore are mined and milled separately; 500 tons per day of mixed sulphide ore and 100 tons per day of oxide lead ore containing cerussite, wulfenite, galena, anglesite and vanadinite. Test work showed the best promoter combination in the oxide circuit to be Reagent 425 and Reagent 301, used with sodium sulphide in a soda ash circuit with a pH of 8.8 to 9.0. AEROFLOAT 31 as a supplementary promoter and frother, and cresylic acid as a frother are also used. From a head value of 3.23% Pb, a recovery of 88.55% was made in a concentrate assaying 50.52% Pb. Further testing on the mill showed that changing the point of addition of the AEROFLOAT 31-cresylic acid mixture from the first flotation machine to the grinding circuit resulted in increasing recovery of lead to 93%. Recoveries of precious metal values are excellent.

In the sulphide lead-zinc circuit AERO Brand Cyanide has been found most effective as a depressant in the lead circuit, with Thioarbanilide 130 as the principal lead promoter.

\*Aerofloat is a registered trademark of American Cyanamid Co. applied to certain flotation reagents of its manufacture.

You, too, may profit by challenging time-honored ideas of permissible reagent costs and relative reagent efficiencies. New Cyanamid reagents, known to be more efficient but sometimes considered too high-priced, may prove to be most economical under today's mill operating conditions. In your own check-up of treatment methods

**COLORADO** A large flotation mill in Colorado treating complex mine and custom ores containing lead, zinc, gold, silver, and copper, mainly in sulphide state, found that special reagents could improve operating results. In this mill, a bulk float of sulphide minerals is first made with Reagent 404 (.08 #/Ton) and Pentasol Xanthate. The bulk concentrate is re-ground at a pH of 8.5 with AERO Brand Cyanide, lime, zinc sulphate to depress the zinc. Sodium sulphite and a small amount of Reagent 444 are added to float a concentrate containing gold, silver, lead and copper which is shipped to the smelter. The zinc minerals are activated at a pH of 9.4 with copper sulphate and floated with Sodium AEROFLOAT "B" for shipment to the zinc smelter.

**AFRICA** A 1200 ton per day lead-copper-zinc producer in Africa is treating approximately 500 tons of highly oxidized dump ores containing sulfide and oxide minerals in one section of the mill and 700 tons of run of mine sulfide ore in separate grinding and flotation circuits. Dump ore flowsheet involves first the production of a bulk sulfide concentrate, then the sphalerite in this concentrate is floated away from the lead and copper sulfides using sodium dichromate and approximately 0.25 lbs. per ton of ore of Reagent 610. Satisfactory grades of zinc concentrate and lead-copper concentrate are produced.

The oxide lead and copper minerals in the bulk sulfide tailing are floated with sodium-hydroxysulfide, Reagent 301 and varying amounts of Reagent 404 up to 1.0 lb. per ton of ore. Run-of-mine ore is treated by conventional selective flotation procedures.

**COLORADO** This 500 ton per day base metal mill treats a sulphide ore containing galena, chalcopryite and sphalerite in a quartz gangue. Copper and lead are floated first, followed by a zinc float; the copper and lead being separated in a third circuit. Promoters for the first float are Reagent 404 (0.05 lbs/ton) and amyl xanthate (0.04 lbs/ton). Sodium cyanide, zinc sulphate and sodium sulfite are the chief depressants. For separating the copper-lead concentrate only sodium cyanide (0.40 lbs/ton) and sodium sulphite (0.08 lbs/ton) are used. Lead concentrates average over 67% Pb, with 91% recovery from a head of 2.13% Pb. The copper concentrates average 25% Cu, with 82% recovery from a head of 0.97% Cu. The metallurgist for this operation reports that Reagent 404 was found to have the highest selectivity for galena of the many reagents tried.

and reagent combinations, Cyanamid Field Engineers and the Cyanamid Mineral Dressing Laboratory stand ready to help. An unbiased review of your present beneficiation practice may reveal worthwhile opportunities to increase recovery, cut costs or expand output. Starting point is a discussion of your current metallurgy and ultimate objectives.

# AMERICAN Cyanamid COMPANY

## MINERAL DRESSING DIVISION

30 ROCKEFELLER PLAZA NEW YORK 20, NEW YORK



## NEW GRAVITY CONCENTRATOR DEVELOPED FOR RECOVERY IN SIZE RANGES BELOW QUARTER INCH

Announced at a recent mining conference in Minnesota is the Weing Concentrator, capable of making separations in the size ranges below  $\frac{1}{4}$ -inch, where present gravity processes are unsatisfactory. First major application of the simple machine will be on low-grade Mesabi intermediate ores, where pilot operations will be in progress early in the 1950 season.

The machine, which is based upon the Wetherbee Iron Ore Concentrator with which brief experiments were conducted some 35 years ago, consists of a cylindrical rotor operating on a vertical axis in a circular tank of somewhat larger diameter. A discharge opening in the center of the bottom and an annular sloping launder around the top provide for collection and discharge of sink and float products, respectively.

Concentrating action is effected in an unusual manner. Raw ore feed passes into the center of the rotor and is expelled through peripheral ports by centrifugal action into the space between rotor and tank. The rotor is closed below the ports, and the bottom third of the rotor comprises an air pocket in which air is rhythmically compressed and expanded by revolving action of the rotor, contributing materially to the concentrating action. Centered in the discharge port in the bottom of the tank is an inlet for water under moderate pressure. An impeller at the bottom of the rotor diffuses the water which rises in eddying currents to the top of the tank, carrying off the light constituents of the feed.

Variable mechanical features are: rotor speed, rotor distance above the tank bottom, amount of water admitted at the bottom, rate of feed, and flow of water in the launder. The Concentrator is very economical in

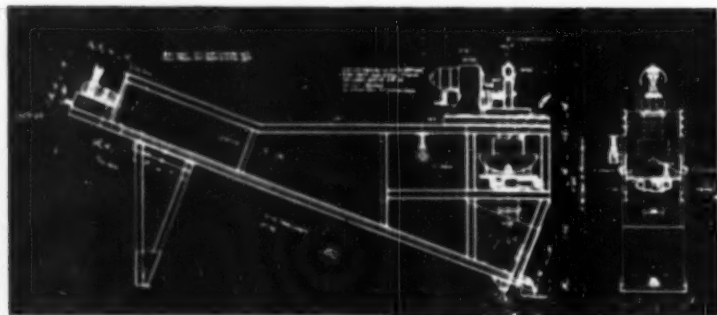


Concentrator is offered on laboratory scale for testing with various materials.

the use of both water and power. Capacities are surprisingly large in relation to power and floor space requirements.

Patented by the Colorado Iron Works Company, Denver, Colo., the Weing Concentrator will be offered commercially in combination with a dewatering unit consisting of a modified Akins Classifier using a common pool level with the Concentrator, as shown in the accompanying drawing. Also offered is the laboratory model pictured, including all equipment necessary for laboratory testing and experimentation on various materials. Literature on the machine may be obtained by writing to MINING WORLD or from the Manufacturer.

Drawing shows how Weing concentrator may be used in combination with a dewatering unit, consisting of modified Akins classifier, at a common pool level.



## A-C Improves Their Type R Crusher

Hydrocone crushers made by Allis-Chalmers, formerly known as Type R, have been improved and extended with the inclusion of 51- 60- and 84-inch units for maximum efficiency in the preparation of crushed stone aggregate and in the reduction of ore, according to an announcement by G. V. Woody, manager of the company's basic industries machinery department.

The three larger Hydrocone crushers include an increased number of crushing chambers to meet the expanding requirements for finer reduction crushing in a larger range of capacities.

New design features of the Hydrocone crushers include a wobble plate feeder driven by crusher shaft which distributes the feed more evenly; a new dust seal for the main eccentric bearing which gives longer life to wearing parts and reduces maintenance costs; mantles and concave rings of mantalloy to reduce wear; and finer crushing chambers specifically designed for the production of large tonnages of fine material.

Data concerning the Hydrocone crushers are contained in a new Bulletin, 67B7145A, copies of which are available upon request from Mining World, 121 Second St., San Francisco, California.

## Robins Conveyor Offered As a Package

The heavy belt conveying industry continues the modern industrial trend toward packaging with the introduction by Hewitt-Robins, Incorporated, of a sectionalized belt conveyor that can be shipped as a package and installed in the field without the help of trained technicians in about one-fourth the time required for a conventional type conveyor.

The Robins Sectionalized Conveyor, which comes in short lengths designed for quick assembling, is a development of a company that usually engineers conveyor systems for carrying coal, ore and aggregates for miles. It comes in sections of 15½, 18½ and 21½ foot lengths that can be bolted together according to the needs of the job at special joints designed to facilitate assembling and assure correct alignment.

Aggregates can be conveyed at 300 tons an hour over the new conveyor, which is designed primarily for small scale operations. Coal, coke, ores and dirt can also be handled.

First installation of the Robins Sectionalized Conveyor has been made at the cement block plant of the East Coast Lumber Terminal, Farmingdale, Long Island, New York, where twin conveyors handle sand and gravel on 24-inch 4-ply self-aligning Ajax belts at a rate of 300 feet-per-minute.

## Prominent Men

Continued from Page 25

Lionel A. Forsyth succeeds C. B. Lang as president of Dominion Steel and Coal Corporation and its subsidiaries and associated companies. Lang has become chairman of the board. Offices are at Montreal, Quebec.

A. E. O'Brien was appointed superintendent of safety for International Nickel Company at Copper Cliff, Ontario. He was superintendent at Frood-Stobie Mine and will be succeeded there by C. H. Stewart, H.



Kennecott in 1925 as a safety engineer at the Bingham mine.

H. L. GARRITY is Kennecott Copper Corporation's new superintendent of mines for the Utah Copper Division, Salt Lake City. He is a graduate of the University of Utah and joined

W. Smith, assistant superintendent at Frood-Stobie, has become superintendent at Murray Mine, Ontario.

Marvin B. Selden is a metallurgist for American Smelting & Refining Company at Santa Barbara, Chihuahua, Mexico, through a recent transfer.

J. Dumaresq Smith is new president of McFinley Red Lake Gold Mines and Julian Zacks is vice president. The mine is in Northern Ontario.

Dr. Juan Bautista de Nardo, who is professor of metallurgy in the University of La Plata, Buenos Aires, Argentina, was in England during January and February. He met British scientists and metallurgists and studied the latest developments of metals.

John C. Anderson, Jr., is working for Kaiser Aluminum & Chemical Corporation at Mandeville, Jamaica, B.W.I., as a mining engineer.

W. R. Lindsay has been made man-



is H. T. Caddy, and W. A. Benson becomes assistant resident engineer.

aging director of Rico Copper Mines, Ltd., British Columbia.

Wallace W. Agey, metallurgist for the U. S. Bureau of Mines, is now working in Mexico City in care of the American Embassy, Bureau of Mines.

64 Paseo de la Reforma, having transferred from Salt Lake City, Utah.

H. T. Middlebrook has been transferred from Jamaica to Arkansas to be chief engineer for the Reynolds Mining Corporation, subsidiary of Reynolds Metal Company, at Alexander.

Alfred Kirby, Lucien Lachapelle and Alfred J. Bendall have been appointed new directors of Anacon Lead Mines Ltd., Toronto, Ontario, Canada.

C. J. Busby has been elected a director of Esperanza Copper & Sulphur Company, Ltd., London, England. The company's mines are in Cyprus.

W. M. Frames has resigned the chairmanship of Consolidated Main Reef Mines & Estate, Johannesburg, South Africa. He has been succeeded by P. H. Anderson, who also has been elected a director of Durban Rooderpoort Deep, East Rand Proprietary and Rose Deep.

I. C. Mullinger has been appointed secretary in the London offices of New Consolidated Goldfields, Ltd., and the Consolidated Goldfields of South Africa.

Charles R. Cox has been elected a director and president of Braden Copper Company, Kennecott Copper Corporation's Chilean subsidiary. (Cox is also the new president of



the place of Harvey B. Jordan, new president.

WALTER F. MUMFORD,

for 30 years an employee of American Steel & Wire Company, Cleveland, Ohio, has been elected vice-president in charge of operations, taking

Kennecott, New York). C. T. Ulrich has resigned as president and treasurer of Braden but will continue as a director.

R. S. Reynolds, Jr., Reynolds Metals Company, was elected president of the Aluminum Association recently. Vice presidents elected were E. G. Grundstrom, M. E. Rosenthal, George N. Wright. Re-elected chairman of the board was A. V. Davis, and Donald M. White was appointed secretary and treasurer.

Dr. Louis Koenig of Chicago has accepted the newly created post of assistant director of research at Stanford Research Institute, Stanford, California. He formerly was chairman of chemistry and chemical engineering at Armour Research Foundation at Chicago. At the Institute he will have charge of chemical engineering metallurgy, chemistry, and several other Institute activities.

Vernon F. Daughney has become a senior mineral dressing engineer

T. J. JENSEN

has been appointed sales manager of the Colorado Iron Works Company, Denver, Colorado. He is a graduate in Chemical Engineering from Colorado University and



worked for mining companies in the U. S., Alaska and South America before joining Colorado Iron in 1945 as field engineer.

for the Mineral Dressing Laboratory of the American Cyanamid Company, Stamford, Connecticut. He is a native of New Brunswick, Canada, a graduate of the university there and has worked for several Canadian mining companies as mill superintendent, metallurgist, and consultant. Dr. Wilbur H. Miller has been made technical representative and assistant manager of American Cyanamid's, Washington, D. C., office, where he will help co-ordinate the work of the governmental laboratories and the company's technical facilities.

Robert L. Coe was elected president of Chase Brass & Copper Company, Waterbury, Connecticut, recently to succeed Charles E. Hart, who retired January 1. Coe is a vice-president of Kennecott Copper Corporation and president of Kennecott Wire & Cable Company.

Alvin J. Herzig has been elected president of the Climax Molybdenum Company of Michigan at Detroit. The company is a subsidiary of the Climax Molybdenum Company, Climax, Colorado. Herzig has been associated with the former for 19 years.

Dr. Esper S. Larsen, III, was appointed assistant chief geologist in the Geologic Division of the U. S. Geological Survey recently by Dr. W. E. Wrather, director of the Survey. Larsen replaces Dr. Harry S. Ladd, who wished to resume special research work.

Charles F. Ayer resigned the presidency of Magma Copper Company, Arizona, and has been succeeded by A. J. McNab, former executive vice president. Ayer continues as a director.

## Obituaries

H. G. Darling, 64, member of the board of Broken Hill Pty. Company, Ltd., from 1914 and chairman from 1923 until now, died at Melbourne, Australia, January 26. He was also chairman of Australian Iron & Steel, Ltd., and of Wellington Alluvials, and held directorships in many other companies.

E. G. Theodore, 66, one-time Premier of Queensland, Australia, and Commonwealth Treasurer, died February 9. He was responsible for the exploration and development of Fijian mining properties which later became famous as the Emperor, Loloma and Dolphin mines.

## INTERNATIONAL NEWS

### LIBERIAN RAILROAD ADVANCES FROM MONROVIA TOWARD BOMI HILLS IRON ORE DEPOSIT

The 45 mile railroad which Liberia Mining Company, Ltd., is constructing to develop Bomi Hills' iron ore is making its way northward from Monrovia, Liberia. The railroad is a major link in Libminco's projected system of mining, ore handling, transportation to port, and transoceanic shipment. By 1952, the system is expected to deliver 1,000,000 tons of top-grade iron ore to U. S. furnaces annually.

Republic Steel Corporation, aided by a \$4,000,000 loan from the U. S. Export-Import Bank, organized the Liberian Mining Company (Libminco) in 1946 to develop the rich Bomi Ridge area. Lansell K. Christie, now president of the company, negotiated mining agreements with President William V. S. Tubman of Liberia in 1946. Mining rights to lands within a 45 mile radius of Bomi Hills were conceded to the company.

Because ores from Bomi are hard, coarse, and carry 68.9 percent iron, they will be ideal open-hearth feed, equalled possibly by only the Kiruna deposits in Sweden.

A service road, near to the railroad route, was cut through the dense low-lying bush country as the first step in railroad construction. 18 reinforced concrete and two steel bridges are reportedly completed. Balanced cut-and-fill excavation (25 percent complete in January) will give the railroad a gradual climb of 170' from Monrovia to Bomi Hills, general manager Joannes Van de Velde calls it "an engineer's dream."

Recent reports indicate that track-laying is now under way at the Monrovia end.

Ten-car trains, which will carry ores, will make the trip to Monrovia in two hours. They will travel down-grade under full load and will return up-grade with empties. Ore will be unloaded at a 250-acre stockpile plant, and then loaded by a 3,000-ton per hour conveyor belt system into a fleet of four company owned ore ships. The ships will each carry 22,000 tons of ore, and will make a round trip to eastern or southern U. S. ports every 13 days. Of 1952's 1,000,000-ton annual production, Republic expects to use one half, and sell the other half on the world iron ore market.

And in the creation of this new enterprise, President Tubman's little republic gets a new railroad, a new industry, almost a new economy.

### The McRae-Patty Placers Show Much Progress

The McRae-Patty placer operations in Yukon Territory and in Alaska, though now closed until the end of winter, have shown much progress in spite of the difficulties encountered by high materials and labor costs and the price of gold.

The Alaskan operations are handled by two companies: Gold Placers, Inc., working at Coal Creek, and Alluvial Golds, Inc., working at Woodchopper Creek. Both of these companies use steel pontoon dredges with 4½ cu. ft. buckets and have been in production since 1935.

The Yukon Territory operations also are handled by two companies: Clear Creek Placers, Ltd., working at Clear Creek about 60 miles east of Dawson, Y. T., and Yukon Gold Placers, Ltd., working at Henderson Creek, 80 miles up the Yukon River from Dawson, and at Thistle Creek, 100 miles up the river. At Henderson a new dredge of the type and size described above was used during 1949 and was very successful. The Thistle Creek dredge was erected during 1949 and did three months of digging before winter. Walter W. Johnson Company of San Francisco designed the dredges.

Stripping of muck overburden is carried on well in advance of dredging to expose the relatively shallow gravels to two or three seasons of natural thawing and to eliminate water thawing.

The designation "McRae-Patty" is used because Ernest Patty manages all the dredges for the above companies although they do not have identical ownership.

### Philippine Mine Situation Pre-war and Post-war

Based upon production figures for the eleven months of 1949 and estimating the results for the final month, it appears that the production of gold in the Philippine Islands will approach the \$10,000,000 mark. This is a substantial gain over the 1948 production of \$7,125,000. Yet it is still a far cry from the \$50,000,000 pre-war business when the Islands were one of the major gold producing areas in the world.

With the determination to revitalize the mining industry, heads of

mining companies and government officials have continued their meetings during December. They agreed that one effective means for stimulating greater interest in new mines as well as making possible the rehabilitation of pre-war producers would be a reduction of taxes. A program for revision of taxes is under serious consideration.

A second matter of possibly greater importance to the recuperating mining industry is continuance of the free gold bullion market in Manila. Ever since resumption of postwar gold production the Philippine mines have been fortunate in being able to dispose of their gold bullion at a considerable premium over the official world price of \$35 per ounce. Premium prices ranging from \$40 to as high as \$60 are reported to have been paid with the bulk of sales being effected at \$45 to \$50 per ounce. Thus, the gold producers have been able to obtain 30 to 40 percent above the official gold price.

However, with the clamping on of Exchange Controls in December, 1949, the continuation of the free gold market is a matter of government policy though it remains of paramount importance to the mines. The Government realizes that whatever action is taken must be such as to encourage the mines and to induce the flow of capital into the industry. However, what course will be followed remains yet to be determined.

### Monsanto Options Utah Phosphate Property

An option to purchase 3,000 acres of phosphate-bearing land at Vernal, Utah, from the Humphreys Phosphate Company of Denver, has been taken by the Monsanto Chemical Company. J. L. Christian of St. Louis, Missouri, general manager for Monsanto's phosphate division, made the announcement. The agreement also covers 200 acres of adjoining land owned by J. H. Ratliff. The option lasts five years and exploratory work which is planned will take probably three years. Development will be pushed if the proposed Echo Park dam near Vernal is constructed.

The Humphreys' property covers about 15,000 acres of rugged terrain and has been held by the family for many years. All mineral rights now belong to Humphreys and the Monsanto company will not be affected by any Federal leasing systems or reports.

# JOB PROVED...

# 10-Ton "EUC"

Emerging from a tunnel which leads to an underground loading area, this Model UD starts up the haul road to the crushing plant at C. A. Langford Stone Company in Tennessee.



The Acme Construction Company uses this 10-Ton Rear-Dump on a highway construction job at Matoaka, W. Va. The "Euc" is loaded with earth and shale by a  $1\frac{1}{4}$  cu. yd. shovel.



Powered by a 125 h.p. diesel engine, the Model UD has a top speed of 35.7 m.p.h. and plenty of power for steep grades. The 860' haul road at the C. A. Langford quarry near Cookeville, Tenn., has a maximum grade of 10%.



High dumping angle and fast-acting Euclid hoist assure quick dumping. Here the "Euc" dumps a capacity load of limestone into crusher at the H. & R. Stone Company quarry at Ridgeville, Ind.

Built for jobs requiring a smaller capacity hauling unit for heavy off-the-highway service, the 10-Ton Rear-Dump Euclid has made good ... hauling more tons at less cost in mines, quarries, construction and industrial work. Owners like the Model UD because it is easy to handle ... has ample power and speed ... and can do a wide range of jobs economically.

You can depend on the 10-Ton Euclid for greater job profits and long service life. Your Euclid distributor will be glad to discuss your job requirements ... write or call him today for information on the Model UD Rear-Dump or the complete line of Euclid earth moving equipment.

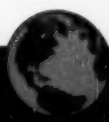
THE EUCLID ROAD MACHINERY CO.  
CLEVELAND 17, OHIO



# EUCLIDS



*Move the Earth*



## COPPER POWDER METALLURGY GIVEN IMPETUS BY JAPANESE UTILIZING OF PULP MILL LIQUOR

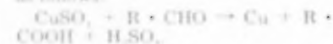
By Kannonuke Hayami

WORLD MINING Correspondent  
Tokyo

A new method of precipitating pure copper powder from copper sulfate solution has been devised by Professor Yoshiki Ogawa of the Tokyo University. Its principle consists in utilizing the reducing power of waste sulfite pulp liquor which is due perhaps to the presence of aldehyde radicals. The copper sulfate solution is mixed with waste sulfite pulp liquor, the proportion varying with the copper content, and is digested for about three hours at 140° C, the optimum temperature for the reaction.

Hitherto cement copper has been deemed to be far too short of fulfilling the purity requirements of powder metallurgy.

The reaction can best be illustrated as follows:



Best results can be obtained by controlling the  $\text{H}_2\text{SO}_4$  concentration. The reaction can be considered to advance in two steps; first,  $\text{Cu} \rightarrow \text{Cu}$ , then  $\text{Cu} \rightarrow$  metallic copper.

Purity of the precipitated powder is at least equal to that of the electrolytic copper; that is, 99.99 percent, even if the original solution contained high concentration of many impurities with the exception of noble elements such as silver. If the noble metals are not present, it can reach as high as 99.9957 percent. (Data obtained by spectro-analysis.)

Each grain of the powder has been found to be in the form of a polyhedral single crystal with the length of 10 to 30 microns, more than 35 percent of the powder consists of grains under -250 mesh.

Attempts are being made to use the powder in manufacturing metallic brushes and other sintering purposes. The powder can also be pressed and drawn into wires.

For practical application, the use of "Kusumono" (complex pyrites), which is abundant in Tohoku district, is being considered. The ore can be shipped to a plant in the vicinity of a sulfite pulp factory with ease. The other possible application is the utilization of mine water. For instance, that of the Konaka mine in Akita has a considerable  $\text{CuSO}_4$  concentration.

The process is yet in the pilot plant stage, but the production cost obtained by these experiments is 120,000 yen/ton—about 363 dollars—(when the transportation cost of the

sulfite pulp waste is not considered), which can compete with the present control price of 180,000 yen/ton.

It has some advantages of its own; it does not need such a great quantity of electricity as is needed for electrolytic copper when Japan is still short of power; also labor costs are low. The process may open a new field in the wet metallurgy of copper.

## Spanish Pyrite Reserves Ample for Long Term

During the Geologic Conference held in Washington, D.C., in 1933, world reserves of pyrite were estimated at 907,000,000 tons of which 485,000,000 tons, or 53 percent, was assigned to Spain. Of this quantity, 273,000,000 tons was termed proved which would provide 3,000,000 tons annually for approximately a century.

According to recent calculations, proved pyrite reserves in Spain contain the following tonnages:

	Tons
Rio Tinto	4,000,000
San Platon	700,000
Concepcion	800,000
San Telmo	800,000
Castillo de las Guardas	600,000
Total	6,900,000

All of these deposits lie in the Province of Huelva and are associated with indications of hypogene rocks.

Also, the pyrite deposits of Toscana, Italy, are at the contact of limestone with Tertiary granite and at Falun, Sweden, where the most important deposits are—following the Spanish deposits—the sulphides are associated with porphyries, as in the case of Rio Tinto.

## Strategic Minerals Show Promise in Sao Paulo

Sorocaba, Sao Paulo state, Brazil, promises to be a very important mining center in the near future. The minerals found in this region are cassiterite, wolframite, molybdenite, galena, sphalerite and fluorite. Detailed geological studies of the mineralized area have shown that the deposits are of high economic value. The minerals mentioned above occur not only disseminated in the granite but also in several veins of notable length and width.

Euhedral crystals of cassiterite measuring a few centimeters were found in the place named "Sítio do

Arado." Cassiterite occurs more abundantly in the tourmalinized area of the granite and veins, where the tin content is high. Wolframite, which is found in variable amounts, appears almost in all quartz veins, occurring as large radiated masses of considerable dimensions. Crystals of 5 centimeters long are common. The  $\text{WO}_3$  content is 67.2 percent (metallic wolfram—53.3 percent).

## Open Pit Method Used at Canadian Iron Deposit

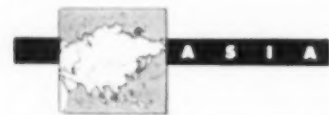
A billion tons of iron ore is estimated to exist in the 200,000 acres of land surrounding Jamestown, Ontario, 100 miles north of Sault Sainte Marie.

Algoma Ore Properties, Ltd., a subsidiary of Algoma Steel Corporation, is developing the deposits. The company also owns and operates the well-known producer, Helen Mine.

Situated in remote hinterland, the property presented problems in transportation of machinery which were not overcome completely until 1940. Since then Jamestown has become a community of 2,000 people.

Diamond drilling has established two orebodies on Siderite Hill, one 600' long and 100' wide, the other 1,750' long and 200' wide. Iron and manganese existing in these deposits parallel in value the ore at Helen Mine, which produces 600,000 tons a year.

Mining is by the open pit method now and 12,000,000 tons is expected to be taken out before underground operations need begin.



**MALAYA**—Tin producers are favoring restricted output from their Malayan properties, and considerable discussion is going on in order to set up lower levels of production.

**INDIA**—Aluminum producers have set 3,550 tons as their 1950 production target, although capacity is actually about 6,000 tons. Insufficient electric power, low quantities of gasoline for the transport of bauxite ore, and slow transportation of petroleum coke through Pakistan are the reasons for the inability to obtain capacity output. India's annual consumption is 12,000 tons at present.

**BURMA**—J. R. Govett, chairman of the Burma Corporation, had an unhappy report to make on the effect of the political disorders on the mine's activities. Productive mining was stopped last March when the railway to Rangoon was closed; it still shows



## INTERNATIONAL

no sign of reopening. The company is still incurring labor and maintenance costs without having any counterbalancing revenue. Between September, 1945, and January, 1950, the company's financial resources declined by £1,750,000 in spite of revenue of £1,900,000. Unless the situation in Burma improves substantially this year, which is unlikely, Mr. Govett expects the mine, one of the most famous silver, lead, zinc operations in the East, will have to close down.

**MALAYA**—Tongkah Harbour Tin Dredging, Ltd., reports a credit of £24,774 from its operations during the fiscal year ended June 30, 1949. This was the first year of operation since 1941. The Bidor dredge at Perak treated 1,412,000 cu. yds. from which 357.38 tons of tin concentrates were produced. In Siam rehabilitation of the Harbour dredge continued slowly. In the Ranbipon section a third dredge and the mine property are still on a care and maintenance basis.

**FRENCH INDOCHINA**—Iron ore deposits have been discovered near Tonkin, Vietnam. French metallurgists consider them extensive enough to investigate further with an ultimate goal of establishing an iron industry in the country.

**CHINA**—Communists expect to develop the iron and steel industry and the metal industry in general in Manchuria through a plan recently drawn up in Peking. Workers will be sent from other sections of China to Manchuria to man the plants.

**INDIA**—A plant for processing uranium should be operating within a year, according to Prime Minister Nehru, who advised that, in time, India would produce its own atomic energy. Research workers and technical personnel are scarce, but Nehru said they are being trained both in India and abroad, besides which the advice of foreign scientists was available.

**BURMA**—The last of Anglo-Oriental-Malaya, Ltd.'s tin dredges has been closed down by guerrillas in the Tavoy area. The company said that its three dredges were now inoperative and that no one knew whether or not they had been damaged.



LATIN AMERICA

**MEXICO**—Sierra Madre Mining Company, located 45 air miles from Mazatlan, Sinaloa, has finished installing a 50-ton mill at its property, has ordered a power plant, and has completed an air field. About 2,000 tons of silver-gold ore is stockpiled ready to be milled, and production

is expected to get under way in May. Alvin W. Mackey is engineer.

**BRITISH GUIANA**—Horizons, Ltd., has been formed with the object of financing gold and diamond mining and industrial projects as well as some exploration and has opened operational headquarters at 21 America Street, Georgetown, British Guiana. The company, which was incorporated under the laws of Alberta, Canada, maintains its head office at Calgary. The initial operation is a placer project in British Guiana where preliminary sampling has begun. President, managing director and engineer of the company is A. L. Reading, mine superintendent is Wallace Wade.

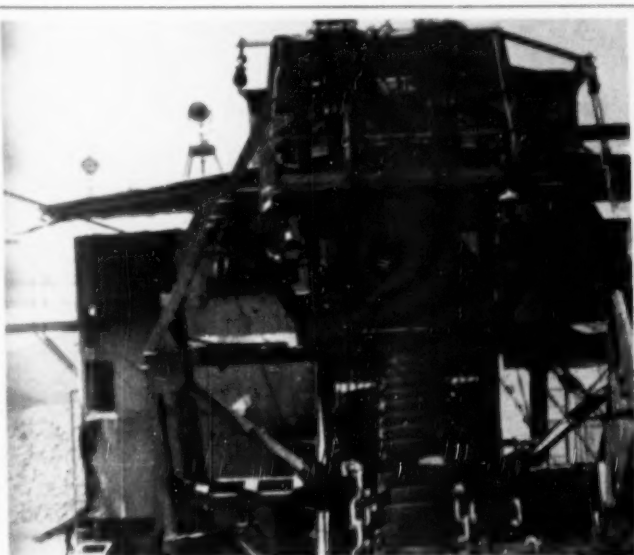
**MEXICO**—New companies in Mexico include: Cia. Minera de Piedra Iman, S. A., which has been organized and registered in Mexico, D. F., by Carlos Sanchez and Luis J. Lupan, Roma, No. 19, Mexico, D. F., and Compania Minera del Penon Blanco, S. A., which has been organized by the former owners of the La Azul, S. de R. L., now under new management. J. Jesus Prado is gen-

eral superintendent of both Compania Minera and La Azul, which produce fluorspar in the Taxco area.

**DOMINICAN REPUBLIC**—After a year of intensive research a report recently was released on the finding of large magnetite deposits in Duarte Province, 100 miles from Ciudad Trujillo. An area of about 64,000 hectares was prospected and mapped, shafts were sunk and trenches dug. Dr. Renato Zoppis de Sena, geological consultant to the Ministry of National Economy, said that exploitation could begin at any time as the ore is readily accessible.

**VENEZUELA**—Mine mechanization continues at Guayana Mines, Ltd., in the Callao district of eastern Venezuela. Mining and development is going on in three of the mines, the Laguna, Sosa-Mendez and Colombia, where reserves are estimated at 240,000 tons of gold-bearing ore. When a higher operating efficiency is achieved by the rehabilitation of machinery and methods, other mines will be developed.

**MEXICO**—The San Luis Potosi government is arranging aid for va-



### ASNazu GOLD DREDGE IN COLOMBIA

Above is a view of the connected bucket line dredge at Asnazu Gold Dredging Ltd.'s property in Colombia. The company is operated by Placer Development Ltd. of Vancouver, British Columbia, which also operates Nechi Consolidated Dredging Ltd., and Pato Consolidated Gold Dredging Ltd. Although Asnazu produced a lower tonnage in 1949 than in 1948, a large increase in the output of Pato more than made up the difference. Figures for 1949 on the dredging operations of these Colombia affiliates are as follows: Asnazu, 5,446,600 cu. yds. for recovery of 22,484 fine oz. of gold (1,000,000 cu. yds. less than were dredged in 1948); Nechi, which began operations in September, 1,262,000 cu. yds. for 8,113 fine oz.; Pato, 16,897,000 cu. yds. for 129,279 fine oz.

# INTERNATIONAL

rous unemployed miners who asked for the assistance to work mines co-operatively that *Csa Miera La Victoria, S.A.* abandoned as unprofitable some time ago in the Cerro de San Pedro region. The jobless miners convinced the government that they can work the mines profitably.

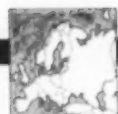
**CUBA**—At Nueva Gerona, the Isle of Pines Mining Company reports better than mine average gold values in its newly opened 325' level, where drifting on the main vein is in progress. Other activities include stoping preparation on the 200' level and stockpiling from surface orebodies. The mill began operating recently at a rate of 80 tons per day which will be increased to 200 tons a day in time.

**MEXICO**—The Chamber of Deputies has passed a bill controlling the import, export and transport of uranium or its derivatives and making it a federal offense to conceal the finding of uranium ore deposits. All uranium resources have been the property of the government since 1943 and mining companies must sell any uranium-bearing land they own to the government.

**MEXICO**—Insufficient capital and under par servicing of machinery and equipment, electricity and communications, but principally the lack of ample money, were cited as the prime current deficiencies of Mexican mining by Ing. Adrian Esteve, chief of the geological-mining studies section of

the industrial investigations department of the Bank of Mexico. He urged modernization of the industry in all its branches, from high grade to low grade, and stressed helping small and medium scale operators to install treatment plants so that much low-grade ore, too costly to ship, would be recoverable. He also recommended that exporting of iron ore cease or Mexico will be deprived of a vital industrial substance in the future. Mexico has been exporting more than half of its iron ore production and is obliged to buy abroad much iron and steel because coke supplies are too low to allow expansion of iron and steel production.

**BOLIVIA**—At Villazon, near the Argentine frontier, a mining engineer is said to have discovered uranium. According to the report the deposits could be exploited immediately.



## EUROPE

**FRANCE**—The Mines d'Etain of Bois-Vert-d'Abaretz and of Nozay are to be opened after 12 years' idleness by the *Natause des Minerais de l'Ouest*, an affiliate of the J. J. Cernaud et Forges Company of Basse-Indre. Two 250-ton excavators have been moved to the property to start open pit operations.

**BULGARIA**—According to word from Yugoslavia, uranium has been discovered in Bulgaria and the deposits are being worked by Russia.

**ENGLAND**—In the Cornwall district at Geevor mine, under the management of J. H. Bennetts, good development is reported. A new three-throw ram pump with a 100 gpm capacity has been installed at the pump station on the 10th level of the main shaft, and on the surface a new steel ore bin and jaw crusher have just been completed with improvements in handling at the shaft head.

**EASTERN GERMANY**—Five German workmen have reported that Russia began mining uranium from a new mine on January 20. The mine is close to the Steinerne Renne railroad station, near Wernigerode, in the Harz Mountains of Germany, and about 18,000 miners will be employed. In the Mansfeld district some 5,000 miners are to be employed to extract uranium from a mine scheduled to begin operations about the middle of April. Combining reports of Russian-operated uranium mines in Germany bring the total of German employment to a possible 150,000 men.

**SWEDEN**—Because of the favorable effect of devaluation, Sweden

## MINING COMPANY TEST DATA

### DEPARTMENT GRINDING

**OBJECT OF TEST** We have to increase capacity from 160 to 225 tons/24 hours. Now have 6'4" ID x 6' overflow ball mill. Marcy states all we have to do is convert to MARCY GRATES. Check this. How about overflow?

**OPERATING CONDITIONS**  
At Present: Mill, 6'4" ID x 6' long. Overflow, Closed Circuit, 25 RPM  
70.1% CS. HP input 102.0 tons/24 hours. 160 KWH/ton. 11.5%  
Ball Consumption 2.87 ton. Grind 11.3% + 65 mesh.  
After installing MARCY Grate discharge head Mill, 6'4" ID x 5'6" long.  
Grate discharge, Closed Circuit, 25 RPM. 79.1% CS. HP input  
112.0 tons/24 hours. 226.4 KWH/ton. 8.9% Ball consumption  
2.67 ton. Grind 10.2% + 65 mesh

SUMMARY	OVERFLOW	MARCY	REMARKS
Mill Size	6'4" x 6'	6'4" x 5'6"	Lost 8" by putting in grate
Tons/24 hours	160	226	Feed, remaining the same
KWH/ton	11.5	8.9	Looks like we save 22.5%
Ball consumption	2.87 ton	2.67 ton	Looks like we save 8.2%
Grind	11.3% + 65 mesh	10.2% + 65 mesh	Some saving here

By converting to MARCY GRATES we gain 9.1% in tonnage and at the same time we save 22.5% in power. Mine & Smelter evidently correct. Recommend we do not purchase bigger overflow mill.

*E. J. McManus*  
Chief Eng.

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PORTLAND, ORE., 1770 Broadway, New York, N.Y.  
SEATTLE, WASH., 1770 Broadway, New York, N.Y.  
VANCOUVER, CANADA, 1770 Broadway, New York, N.Y.

**Mine & Smelter**  
SUPPLY COMPANY

## INTERNATIONAL

will again export charcoal pig iron to the United States. The last shipments were sent as war broke out.

**WESTERN GERMANY**—Mining and smelting works in this section of Germany are to receive the following credits from ERP funds: 3,000,000 DMks for *Stolberger Zink AG's* Maubach plant, 500,000 DMks for its Bad Ems plant and 480,000 DMks for its Kappel plant; 1,500,000 DMks for *Gewerkschaft Mechernicher Werke's* Mechernich lead mine; 150,000 DMks for *Mine Wildschappach* (lead and zinc); 2,800,000 for *Duisburger Kupferhütte's* Duisburg copper extraction plant; 1,500,000 DMks for *Vereinigte Aluminium-Werke's* Torging and Grevenbroich aluminum reduction plants; and 200,000 DMks for *Hüttenwerke Kayser GmbH's* Lunen copper refinery.

**SWITZERLAND**—Swiss metal imports have dropped off greatly since the decline of prices. Raw copper importation in October was 1,574 tons and in November 753 tons. Zinc and aluminum dropped accordingly. Of goods received, the U. S., Japan and Belgium-Luxemburg supplied the largest amounts (in lead, copper, and lead, respectively). No shipments whatever were received from Yugoslavia in November.

**PORTUGAL**—Portugal will export pyrites, manganese ore and other goods to France, through provisions of a new trade agreement. In turn, France will export iron and steel, chemicals and electrical machinery.

**WESTERN GERMANY**—Recently concluded trade agreements call for Western Germany to export mining machinery to the following countries: Turkey, \$410,000 worth; France, \$5,000,000 worth; and Poland, \$600,000 worth.

**ENGLAND**—*New Consols* mine, situated near Gurnislake, has experienced some trouble during unwatering, owing to flooding of a nearby valley. The water in the mine has risen considerably. However, it is now understood to be under control, and the new concentrating plant is in operation. The ore is very arsenical and flotation is being used ahead of gravity concentration of the cassiterite.

**BELGIUM**—High exports of copper from Belgium continue, the largest amount going to France which buys about 50,000 tons a year. Other consumers are Scandinavia, Germany, South America, South Africa, India and Australia. Because Belgian Congo production during 1949 was lower than estimated (140,000 metric tons were produced), about 10,000 to 15,000 tons of copper were drawn from Belgian and Belgian Congo stockpiles. The failure of the Congo production to come up to the expecta-

tations was due to curtailed hydro-electric power.

**ENGLAND**—In *Weardale, Co. Durham, the United Steel Company, Ltd.*, has reopened the adit on the old Blackdene vein, and fluorspar deposits in the Great Limestone have been developed partially. There is a report that a small development winze sunk below the adit showed good fluorspar.

**GERMANY**—In the Federal German Republic 9,112,000 tons of iron ore was mined during 1949. Fec-content was 2,436,000 tons. In 1948 total tonnage was 7,275,000 and Fec-content 1,919,000.

**SWEDEN**—At the *Kiruna* mine near Kiruna future development includes the sinking of five shafts in the foot wall, each shaft having two crushing stations and a concentrating station, all underground. Production of about 8,000,000 tons of ore per year is expected to be reached through the use of four of the shafts. Mining has been by shrinkage stoping but a slow change-over to sub-level caving is proceeding. Since 1903 130,000,000 tons of iron ore has been produced. The mine is owned by the Swedish State and by the *Trafikaktiebolaget Grangesberg-Oxelösund-Loussavaara-Kiruna* A. B. This company also operates the nearby *Loussavaara* mine.

**ITALY**—Exports of quicksilver, zinc ore, bauxite, and iron and steel are among goods to be sent by Italy to Norway under a new trade and payments agreement. Norway will send ilmenite, ferro-chrome and vanadium-bearing pig iron.

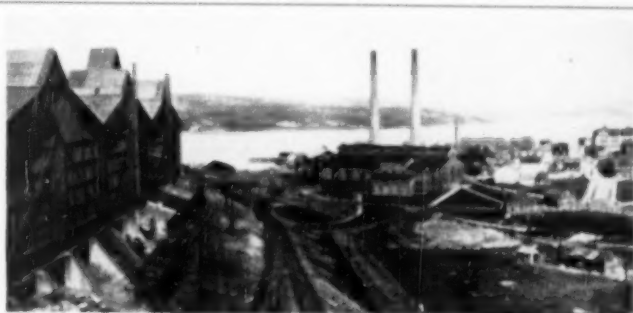
**PORTUGAL**—Import restrictions on iron and steel, nickel, zinc, various minerals and machinery from

OEEC countries, have been lifted by Portugal.

**ENGLAND**—At *Cornwall, South Crofty* development is said to be satisfactory, and a connection has been made between the *New Cooks* and the *Robinson's* sections at the 315 fm. level on No. 4 lode, improving ventilation somewhat. Some 2,455' of development has been completed on this lode at the 315 level. The relining of an old shaft which is the main downcast airway is under way.

**GREECE**—A 200-ton flotation mill will be installed by *Mediterranean Mines, Inc.*, at its silver-lead-zinc properties in the *Laurium* district. Preparations for mining have been completed in some sections of the mine and 300,000 tons of sulphide ore is in sight, according to estimates. About 2,500,000 tons of tailings exists and will be run through the mill eventually. Old workings at the mine were confined mostly to depths not exceeding 100' and a large scale open pit operation for recovery of lowgrade ores may be undertaken eventually. More recent development has established three ore bearing horizons, one overlying the other, at greater depths than before. The company is partially controlled by *Frobisher, Ltd.*, a Canadian firm.

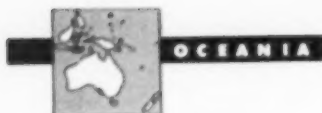
**YUGOSLAVIA**—Construction of a large steel plant has begun at *Gustanj* (Slovenia) and will take several years to complete. At *Nis, Serbia*, a copper rolling mill is being assembled and at *Rijeka* an iron smelting blast furnace has been completed, and a steel melting furnace is nearly finished. Most of this industrial expansion was under the *Five Year Plan*, now half completed, and considerably ahead of itself.



### SYDVARANGER REHABILITATED

About \$29,000,000, including ECA funds in excess of \$1,000,000, is to be spent in the rehabilitation of the mine surface plants and concentrator of the *Sydvaranger* iron mines in northern Norway. Reconstruction is to be undertaken in two stages: the first is scheduled for completion in 1950 and the final stage should be completed by 1955. The above photograph shows the power plant and part of the concentrating facilities before their World War II destruction.

## INTERNATIONAL



**WESTERN AUSTRALIA**—Recent activity in this state is as follows: *Western Australian Goldfields*, basic wage has been advanced to £A 7.48 (\$16.20) per week. Including the gold industry allowance this raises the wages of lowest paid workers (surface laborers) to £A 9.48 (\$20.68) per week, retroactive to January 1. *Western Queen (1936) N. L.* has an 18-months working option over the

*Blue Doe* mine at Boogardie. From 518 tons crushed, more than half an ounce of gold per ton was yielded. *Galena Lead Mines N. L.*, according to R. S. Atkinson, manager, has uncovered good ore in the open cut. Two Wilfley tables have been installed to treat oxidized ore. *Mountain View Gold N. L.*, Day Dawn, earned £A37,322 profit for the year ended November 30. The year 1950 should see this mine change from an exploratory and prospecting proposition to a regular producer. Funds in hand, together with ore in sight, will cover the operating costs, new treatment plant, electric hoist, shaft extensions, and new level developments, for some time ahead. Value of gold reserves

is estimated at £A 200,000—equal to paid up capital.

**PHILIPPINE ISLANDS**—The *Misamis Chromite Company, Inc.*, Manticao, Misamis Oriental, Mindanao, is producing approximately 2,000 tons monthly of 50 percent metallurgical grade chrome ore, which is marketed in the U. S., according to Sam S. Coldren, resident manager. The property is managed by *International Engineering Corporation*, Manila.

**NEW SOUTH WALES**—*New Occidental Gold Mines N. L.* adopted joint recommendations from the mine manager, and consulting geologist H. J. C. Connolly. Development in depth will be halted and production concentrated on reserves. A deep drilling program (estimated cost £A100,000) will be initiated at *New Occidental*, *Chesney*, and *New Cobar* mines. The entire plant and leases of *Mount Boppy Gold Mines Pty. Ltd.*, have been purchased. Dumps on the *Mount Boppy* leases are estimated to contain 2.2 dwt. per ton, and will take four years to treat.

**NORTHERN TERRITORY**—Veteran prospector Martin Freney is now with Morley Cutlack at Ayers Rock. Cutlack believes chances for gold at the Rock are good, but they are still only chances.

**VICTORIA**—J. V. Lake, mine superintendent of *Ballarat South Goldfields N. L.*, reports the striking of a small unprospected alluvial gutter while sinking the shaft which is to test extensions of Ballarat lodes. Testing indicates a grade of about 3½ dwts. per ton.

**QUEENSLAND**—Increased interest has been shown in the Stanthorpe district by tin miners. During December seven new leases were applied for. Yield from this field for 1949 amounted to 33 tons valued at £A13,343. Almost every mine on the Milder field showed renewed activity late in 1949. At the Jasper mine T. Ballantine and party obtained the excellent return of 117¼ ounces from 76 tons of gravel.

**NEW SOUTH WALES**—Discussing a request from the Mining Managers Association, Broken Hill, that the Workers Industrial Union should modify its membership rule to allow the immediate absorption of 300 men required in the silver-lead mines, a meeting of 1,500 members unanimously decided not to open the books of the union to allow more men to be placed. A clause added to the motion of rejection read: "Before we entertain amendment of the rule we must have a complete unconditional seniority clause in our agreement."

**VICTORIA**—Victorian gold production for 1949 failed by 154 ounces to reach the 1948 figure of 68,580 ounces. The State Mines Department attributes the lower production to a

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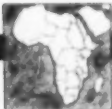
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IN THE WEST: THE CALIFORNIA WIRE CLOTH CORPORATION, GARLAND, CALIFORNIA



fall in grade at Al Consolidated and North Deborah.

**PHILIPPINE ISLANDS**—Diamond drilling by veteran driller, Fred Bezotte, has begun at Mindanao Mother Lode Mines' property near Surigao. The company's new mill is reported finished, with initial testing under way, and a higher percentage of extraction plus a reduction of transportation costs from mine to smelter is expected to be realized through the new equipment. Production in February was 7,400 tons, a drop resulting from the changeover.

**AUSTRALIA**—In order to meet Australian requirements now and in the future, manganese ores have been placed under Commonwealth export control under provisions of the Customs Act.



## AFRICA

**SOUTH AFRICA**—The Messina (Transvaal) Development Company, Ltd., advised shareholders at the annual general meeting recently that plant rehabilitation was on the agenda as old facilities were worn and operating above planned capacity anyway. The No. 1 furnace will be enlarged; a new converter and a new refining furnace will be installed, at a total cost of £70,000. The old plant will be available still for emergency uses. Annual capacity of the new plant will be 15,000 tons of copper.

**MADAGASCAR**—The Asbestos Society of Madagascar proposes to undertake an extended job of prospecting its asbestos deposits, according to H. Peube-Locue of the Société du Quartz de Madagascar.

**SOUTH AFRICA**—The first reinforced concrete mine headgear in South Africa will be at the Margaret shaft of the Stilfontein gold mine, a new property being opened up on the southwest Witwatersrand extension. Most recent news of progress on this property is that the Margaret shaft has reached 77', and that the concrete collar has been installed; a temporary timber headgear is being erected to continue collaring and sinking operations; pending the completion of the first portion of the concrete headgear, and the latter will be 145' high, and carry six 10-ton skips. Temporary sinking winders have been installed. The property's other shaft, the Charles, has reached 172', the permanent steel headgear has been completed, 90 and 250 hp. sinking winders have been installed, and installation of a third sinking winder and standby power plant is well advanced. Foundations for the first permanent winder have been completed, and the winder house is being built.

**EGYPT**—To encourage the importation of aluminum, custom duties have been reduced 15 percent by the Egyptian Ministry of Commerce and Industry.

**BELGIAN CONGO**—Geomines, the Congo's leading tin producer, is installing the first crushing and washing section of its new plant for the treatment of hard rock ores. Capacity is 2,250 tons annually. The company produced 5,100 metric tons of cassiterite in 1949 compared with 4,050 in 1948.

**SOUTH AFRICA**—Recent third and fourth level development in the Gravelotte section of the Consolidated Murchison mine, Eastern Transvaal, has disclosed orebodies containing higher-than-average percentages of antimony metal. The full extent of the ore has not yet been determined. This mine, which in 1948 changed from being primarily a gold producer to being an antimony producer with gold as a secondary product, has had its reserves of gold-bearing ore extensively augmented as a result of the increased gold price. Compared with December 1948, when ore reserves payable on account of gold content only stood at 33,000 tons, the reserve at the end of 1949 stood at 75,000 tons. Over the same period, ore rendered payable by combined gold and antimony content fell from 111,000 tons to 90,000 tons. Question: When will Consolidated Murchison become a gold mine again?

**ORANGE FREE STATE**—During the last three months of 1949, development work proceeded on the second, third, fourth and fifth levels.

north and south of No. 3 incline shafts, on the property of St. Helena Gold Mining Company, the furthest advanced of the mines in the Free State field. Although retarded by water bearing fissures, development totaled 5,203', with 1,270' of Basal Reef exposures sampled, of which 560' was payable at 14.8 dwt/tons over a 13' reef width. The No. 4 vertical shaft was sunk a further 396' to 2,758', and 113' of station-cutting was done. Sinking of the shaft is continuing.

**SOUTHERN RHODESIA**—For the third successive month, the value of Southern Rhodesia's mineral output in November exceeded 1,000,000 pounds. The total of 1,033,555 pounds was made up by 521,376 pounds from gold and 510,329 pounds from base minerals. The month's gold output was slightly up on the October figure, while chrome, coal and asbestos were all at about the October level.

**SOUTH AFRICA**—On Feb. 24, the world-famous Premier Diamond mine, where the Cullinan, the largest diamond ever, was found, resumed fullscale production after a shutdown lasting from the depression of 1932. In reopening the mine, the workings have been converted from openpit to underground. Two vertical shafts, one 1,960' deep, have been sunk alongside the "pipe" of diamondiferous "blue-ground," and connect with the workings, which are to be of the slot-and-pillar type. The No. 2 shaft is to be used as the main traveling way for the native miners and has been sunk from within the compound where they are housed. The Anglo-American Corporation of



## VICTORIA'S LEADING GOLD PRODUCER

The above photograph shows the Morning Star mine, mill and surface plant at Wood's Point, Victoria, Australia. In the Wood's Point-Jamieson district of Victoria, auriferous-diorite dikes intersect sedimentary beds. The dikes are traversed by fault-fissure quartz reefs ("floors") which have been proved to carry profitable gold values. A feature of the dike system is that recurring floors have, after mining to 1,600', shown no sign of values diminishing with depth. The Morning Star is now Victoria's leading producer of gold. From 1915 to 1949, 168,247 tons of ore was crushed for 131,066 ounces; over the same period dividends totalled £A300,000.

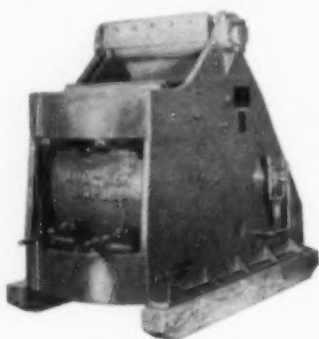


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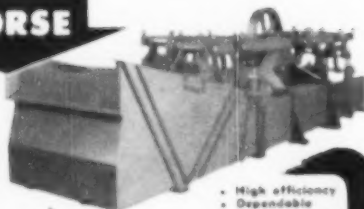
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12 ISSUES

South Africa, the parent company and technical consultant, is pioneering in the application of sink-float to diamond recovery, and a plant to treat 323,000 tons of blue-ground monthly was completed 15 months ahead of schedule. The mine is the first in South Africa in which preliminary ore crushing will be done underground, and for this duty, the largest jaw crusher in the country has been installed.

**ORANGE FREE STATE**—Shaft sinking at the number two shaft of Free State Geduld Mines will be stopped temporarily at a depth of 4,200', about 1,200' above basal reef, to enable underground development to start in the direction of No. 1 bore-hole on farm Geduld 697. This development will connect with an extension of Western Holdings No. 1 shaft and will be off reef until it reaches the common boundary. It is hoped it will come on reef before the £3,500,000 the company currently is raising is spent.

**SOUTHERN RHODESIA**—Mineral production for the first 11 months of 1949 in Southern Rhodesia was valued at £10,225,481. Included in this amount is £4,672,709 from gold and £5,552,653 from base minerals.

**SOUTH AFRICA**—The operating reports for the last quarter of 1949 for the Rand mining groups have been appearing during the past few weeks, and all show substantial increases in ore reserves as a result of the new gold price. Among the groups with greatest increases was the Johannesburg Consolidated Investment Co., the total ore reserves of the five producing mines in this group (East Champ d'Or, Government Gold Mining Areas, New State Mines, Randfontein Estates, and the Witwatersrand mine) increased from 11,272,000 to 15,877,000 tons, a gain of 41 percent. The Johannesburg Consolidated group also has important interests in the Free State goldfield, the foremost being the *Freddies North and Freddies South* properties. Two shafts are at present being sunk on each of these mines, the deepest now being *Freddies North No. 1* shaft, which during the last three months of 1949, was deepened by 664' to 2,572'.

**SOUTHERN RHODESIA**—Pre-production development continued during January on the Piekstone, the gold property in Southern Rhodesia which was reopened about mid '49 after many years of idleness. The main shaft was sunk 24' below the third level. The second level west drive was advanced 90' to 315' and averaged 10 1/2 dwt. ton over a 20' reef width. The main crosscut on the third level was advanced 18' to 48', and the third level west drive advanced 44' to 140' averaging 4 7/8 dwt. ton over 22'.

**SOUTH AFRICA**—The boards of directors of Transvaal Gold Mining Estates, Ltd., and Glynn's Lydenburg, Ltd., two prominent gold producers in the eastern Transvaal, have

announced that agreement has been reached for acquisition of Glynn's Lydenburg by Transvaal Gold Mining Estates, subject to the approval of shareholders, when Glynn's financial year closes on August 1 next. Shareholders in the latter company are to receive two Transvaal shares for each Glynn share held at the time of the changeover.

**UGANDA**—The Kilembe Concession, owned by Frobiaker, Ltd., has been subject to an intensive development program during the past year. According to the annual report, large potential bodies of copper cobalt ore have been indicated or partially developed on the Eastern and Northern Deposits by underground development and diamond drilling. Additional ore possibilities have been suggested by geophysical surveys, and although much work remains to be done before the importance of the property is fully determined, the prospects are good.

**NIGERIA**—According to reports, the Nigerian Government has bought the mineral royalties and mining rights of the United African Company in the northern provinces of Nigeria. The sum was £1,000,000. Although United African did not want to sell the reports say that the transaction was "according to the wishes of the people of Nigeria."

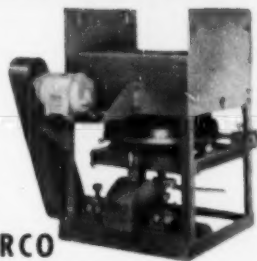
**SOUTH AFRICA**—The first joining of two shafts in the fabulous Orange Free State, in which £100,000,000 eventually will be invested, is reported from the *St. Helena* property. A crosscut from the fourth level workings of the No. 3 incline shaft has holed with the No. 4 vertical shaft. The connection of these shafts will enable more men to be employed underground and will enable development work to go forward more quickly. Good results from developing the Basal reef are expected momentarily.

**FRENCH WEST AFRICA**—Development of extensive iron ore deposits in the Conakry region has been aided by \$337,000 worth of Marshall Plan funds. Phosphate mines will receive \$160,000 worth of compressed air equipment, a conveyor and a steam shovel. Additional ECA mining equipment has been requested for the ilmenite and zircon beach sand deposits near Rufisque, for water drilling at Dakar, and gold mines along the Ivory Coast, and these requests are being studied.

**SOUTHERN RHODESIA**—Although the chief revenue for Falcon Mines comes from the gold-bearing ore at the Sunare and Bay Horse properties, the Dalsy group of claims in the Hartley district gives evidence of becoming, eventually, the backbone of the company's operations. A reduction plant is to be constructed at this property with a 12,000-ton-per-month capacity. Development has put the reserves at 341,000 tons and, as it goes deeper, values increase.

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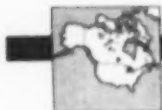
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## INTERNATIONAL

**SOUTH WEST AFRICA**—Lead & Zinc Mines (Pty.) Ltd., is negotiating for the acquisition of the mineral and total assets of Galena Exploration Company, whose property adjoins that of Lead and Zinc Mines. The transaction, when completed, will double the ore reserves of Lead and Zinc Mines. A recently installed flotation plant on the property of the latter has increased monthly production of lead, silver and zinc concentrates considerably.



NORTH AMERICA

**BRITISH COLUMBIA**—Big Four Silver Mines, Ltd., plans to rebuild three towers on the tramline over the Marmot Glacier and simultaneously to rehabilitate, develop and mine the properties serviced by the tram. Because the ores to be mined are of smelting grade, no mill is planned now; however, L. S. Davidson, managing director, points out that erection of a mill may be a good economic move much later when lower-grade ore is developed. However, the company is amalgamating the Dunsmuir property which has a mill and hydro power that can be rehabilitated when and if needed.

**QUEBEC**—Drilling will be done from ice by Inspiration Mining and Development Company, Ltd., under a contract for 5,000' of hole at the Lake Surprise mine at Chibougamau. J. C. Honsberger, consulting engineer, will be in full charge of the campaign. Lake Surprise Mines, Ltd., recently staked several additional

groups of claims in the zone around its initial properties.

**BRITISH COLUMBIA**—The new Reeves-MacDonald mill at Salmo is scheduled to reach its 1,000-ton per day capacity by July 1 of this year. President L. P. Larsen says that there is a good chance that the mill will exceed its capacity by working a total of 1,200 tons per day.

**QUEBEC**—A new deposit, known as the No. 2, is being explored by diamond drilling at Lake Dufault Mines. The latest hole, drilled from the 1,050' level, further outlines a deep-lying body of good zinc ore. This hole is the first of a series which will investigate the thickness, grade and extent of the new zinc vein.

**ONTARIO**—New LaRose Mining & Smelting Ltd., Cobalt, hopes to resume mining operations as soon as the new smelter being erected at Cobalt begins operating. The company recently sold one claim, the LaRose, to H. G. Miller, but retains 11 other properties located in the heart of the Cobalt camp.

**IDAHO**—Three new orebodies are being mined and developed on the 400' level of Clayton Silver Mines property, Clayton, Idaho. The downward extension of the north orebody has been opened over a width of 23' and the face is still in ore as work progresses, according to W. M. Yeaman, president. Grade of the ore is about equivalent to that mined from the 300' level. The unexpected orebody cut several months ago in the north drift on the 400' level is fully developed and shows a length of 60' and a width of 20'. The 100-ton mill has operated uninterruptedly since the first of December on ore mined from the south orebody on the 400'

level. Clayton ore is found in limestone as large shoots, a formation unusual in Idaho mines.

**QUEBEC**—Shaft sinking from the 5,450' level to the 5,850' level is under way at Kirkland Lake Gold Mining Company's property in the Kirkland Lake district. The company hopes soon to start running 400 tons of ore per day through the mill, rather than the 340 tons being handled now because of a restricted power quota. A prospecting project in the Chibougamau district and the Bachelor Lake area of Quebec is being planned for this summer.

**ALASKA**—About 95 percent of Alaskan gold output in 1949 was from placer mines, particularly those using bucket-line dredges, according to the U. S. Bureau of Mines. Total production of gold from all sources in the Territory for 1949 was 220,903 fine ounces (preliminary figure) compared with 248,395 ounces in 1948. The principal producer of gold during last year was the U.S. Smelting, Refining and Mining Company, operating five dredges in the Fairbanks district and two dredges in the Nome district.

**BRITISH COLUMBIA**—During the year ending December 31, 1949, gross production from Virolomac Mines (B.C.) Ltd.'s Victor base metal property was recorded as \$323,084 from 1,717 dry tons. Most of the tonnage came from stoping operations on the No. 4 level; the remainder from development on the No. 5 level. Preparations are now being made for stoping above the No. 5, and doubled output is expected to be the result. The company constructed several new buildings during the year and has accommodations for 65 men of which 36 are employed at the Victor.

**MONTANA**—American Smelting & Refining Company has retained 30 of 140 men to carry on development work at its Mike Horse mine, northwest of Helena, Montana. The curtailed production is a result of the low prices of lead and zinc, according to A. E. Haeseler, general superintendent.

**ONTARIO**—Near Geraldton, Magnet Consolidated Gold Mines, Ltd., is drifting on a new vein encountered south of the footwall vein on the 10th level. Previous drilling indicated a length of 300'. New ore has been found on the 12th, 13th and 14th levels, as well as some small shoots on the older levels. Diamond drilling is in progress on the 7th level where two ore shoots may be proven. Present milling rate is up to about 130 tons daily.

**QUEBEC**—The downward extension of the southwest orebody has been cut by Quemont Mining Corporation, Ltd., in a diamond drilling program on the 2,340' level of its mine at Noranda. The orebodies width so far is 55'. Previous drilling had es-

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## INTERNATIONAL

established the orebody on the 900' and 1,620' levels, and work on the 2,340' level is the deepest in the mine. The ore intersections were made west of the north-south diabase dike extending through Quemont and Noranda Mines properties and will mean some upward revision of estimated ore reserves, which had been figured at 9-400,000 tons, all above the 900' level, sufficient to last 14 years at the current production rate. The plant is operating on a regular schedule producing about 2,000,000 pounds of copper per month, 7,500 ounces of gold, 35,000 ounces of silver, 1,100,000 pounds of zinc and 9,000 tons of dried pyrite concentrate.

**ALASKA**—Some consideration is being given to the start of development work at Montana Lead & Zinc Company's property at the Mahoney Creek mine, near Ketchikan. Improvements in the mill and rehabilitation of machinery would have to be approved before work could begin.

**BRITISH COLUMBIA**—About 100' of ore has been opened up on the bottom level over a four foot width at Cariboo Gold Quartz Mining Company's Wells property. As a result a new deep development program is considered to be warranted, and the first step will be to sink the main shaft 300' to permit establishing a new level at 2,300'.

**QUEBEC**—A shaft sinking program has begun at New Goldvee Mines, near Amos. The present shaft will be put down below 800' and three new levels will be opened at 500', 650' and 800'. Thereafter cross-cutting from each level to the "C" zone will start. The object of the program is to establish continuity of the zone now opened on the 350' level and, if successful, plans for milling will be made.

**BRITISH COLUMBIA**—After four years of construction, Consolidated Mining and Smelting Company, Kimberley, has opened its low-level haulage system on narrow gauge track and will cease using the Canadian Pacific Railway, which has hauled an estimated 50,000,000 tons of lead-zinc ore in the past 24 years. Comco's mine terminal is on the 3,700' level at a large underground crushing plant and narrow gauge tracks run underground for two miles, then emerge and continue another two miles to the new sink-float installations at Chapman Camp where the concentration plant is located. Locomotives for the railway are the 40-ton trolley type.

**OHIO**—The Cleveland Cliffs Iron Company has announced from its Cleveland office a 50 cents per ton advance in the price of iron ore for delivery in 1950. The announcement added that the company already has sold "substantial tonnages" with a guaranteed 51.50 percent natural iron content at the new prices, which are:



### BULLION PRODUCER IN NORTHWEST TERRITORY

Discovery Yellowknife Mines Ltd., Yellowknife, Northwest Territory, reports that its mill produced 1,201 fine oz. of gold in February from an average of 65 tons of ore per day. Mill feed came from the North and West Zones and from the surface ore dump. Shaft sinking has been proceeding on one shift per day and station cutting is under way at the third level. Stope preparations on two levels and shaft sinking started the first of the year when the mill went into operation. Mill rate was 85 tons daily at last reports and will gradually reach 100 tons daily. There are 67 men employed at the mine. J. C. Byrne is president and managing director.

Mesabi range non-Bessemer ore, \$7.70 per ton; Mesabi range Bessemer ore, \$7.85; old range non-Bessemer ore, \$7.95; old range Bessemer ore, \$8.10; and high phosphorus ore, \$7.70.

**YUKON TERRITORY**—A 250-ton mill to cost \$750,000 will be built by Consolidated Yukon Lead and Silver Mines, Ltd., in the Keno Hill area next fall, according to Barry O'Neill, field manager. The company has estimated large ore reserves on its 30-square mile tract. One orebody being mined now is said to average 1,500' long and 30' wide, and a promising new orebody was discovered recently. Ore shipments have been going to Trail, B. C., for milling, but developments at the mine have been encouraging enough to warrant the decision to build a mill there.

**ONTARIO**—The orebody opened up last year on the 970' level of the west zone by Bonet Gold Mines, will be opened up this year on the 800' level and above by drifts. The 970' level is being extended 3,000' to reach the Hallnor boundary. Production during 1949 was 45,377 tons of lowgrade ore from the west zone at shallower levels than those mentioned above.

**QUEBEC**—United Asbestos Corporation, Ltd., has begun collaring its development shaft on the east shore of Black Lake. Pile driving equipment is being used to excavate to bedrock, 24' below the surface of the lake. The three-compartment shaft then will be sunk to 600' to open levels at 250' and 540'.

**NEVADA**—According to all indications the new orebody found at

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## INTERNATIONAL

Deep Mines Operation's White Horse claim is associated with the main geologic structure of the gold-bearing deposits in the Goldfield, Nevada, area. Development has shown much greater depth than anticipated. A winze is still in ore at 450' and the vein was 17' wide at last reports. John Mann, of Newmont Mining Corporation, which directs the Deep Mines

Operation, recently was at the property, and recommended that another winze be sunk to aid in establishing the depth and size of the orebody.

**NORTHWEST TERRITORIES**—At Giant Yellowknife Gold Mines, Yellowknife, a new orebody has been found over a length of 260' on the fourth level in the No. 2 shaft area, and continued drilling from the north

drifts is reported. The No. 3 shaft has been sunk to 346' and a second level established at 250'. The mill is handling about 400 tons of ore daily. Recovery has been increasingly good and ore reserves increased.

**NEWFOUNDLAND**—Diamond drilling on a lead-silver prospect is planned by Independent Mining Corporation this year, according to President J. R. Strathy. The company also owns claims in Ontario.

**SASKATCHEWAN**—Par Athabaska Uranium Mines, Ltd., is planning exploration this summer on its properties in the Lake Athabaska area. Paul V. McNutt and Josiah A. Marvel, Jr., recently have been elected directors of the company.

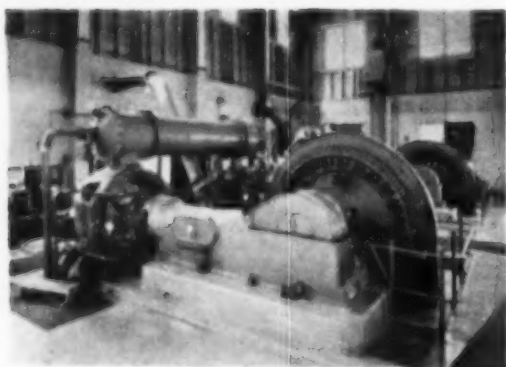
**IDAHO**—Shaft sinking is progressing satisfactorily from the 1,300' to the 1,500' level of Highland-Surprise Consolidated Mining Company's property near Kellogg, Idaho, according to Frank H. Mitchell, superintendent. The Surprise No. 1 orebody on the 1,300' level has been opened up over a length of 200' and two raises have been started.

**BRITISH COLUMBIA**—According to reports, Yuba Consolidated Gold Fields has contracted for dredging rights on 10 miles of placer leases along the Quesnel River from North American Goldfields, Ltd. Yuba will prospect the ground this summer to determine whether the values are sufficient to justify equipping the property for mining operations. North American meanwhile is engaged in investigating lode deposits in the area.

**YUKON TERRITORY**—Eight dredges will be operated by Yukon Consolidated Gold Corporation, Ltd., during the 1950 season. Dredges, stripping and thawing plants are expected to resume operations this month or next, when winter ends.

**MONTANA**—Recent development work at the U. S. Grant Mining Company property near Virginia City, Montana, has uncovered a new vein in the EIFleda mine. The vein was cut by a tunnel being driven from the upper level of the Grant mine to the EIFleda mine, some 1,500' away, in order to develop the EIFleda vein. Although 300' of tunnel remains to be driven the finding of the new vein was a pleasant surprise. Walter H. Myers, president, also reports that he is well pleased with the development work and ore shipments from the west ore shoot on the 200' level. Raises are soon to be holed through to the level above and an increased tonnage of gold-silver ore will be shipped to the smelter. About 60 tons per day is being mined at present and plans are well under way for a large mill to treat several thousand tons of milling ore developed at the Easton-Pacific mine.

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- 1-10 Ton Goodman with GE Controls, 36" Gauge
- 1-10 Ton GE, 36" Gauge
- 1-13 Ton GE, 36" Gauge
- 1-13 Ton Goodman, 36" Gauge
- 2-4 Ton Goodman, 36" Gauge

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- 120-25 cu. ft. Sanford Day drag bottom cars, forged steel wheels and roller bearings, 36" gauge

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- 1-Model 20 Simon, 24" Gauge, can be converted to 24" Gauge
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### SLUSHER HOISTS

- 17-1R NMJC Double Drum, 20 HP Electric
- 6-Sullivan AF211 Double Drum, 20 HP Electric
- 2-Sullivan A211 Double Drum, 20 HP Electric
- 4-1R NMJC Double Drum, 15 HP Electric
- 1-Sullivan HDE4 Double Drum, 15 HP Electric
- 15-Sullivan A211 Double Drum, 15 HP Electric
- 2-Sullivan HDE4 Double Drum, 15 HP Electric

All these hoists reconditioned and guaranteed.

### TUGGER HOISTS

- 16-1R Type EDA, single drum air hoist

### COMPRESSORS

- 2-1R Type PRE-2 4200 Compressors, 750 HP Sys. Motors, 5 step clearance control

### MOTOR GENERATOR SETS

- 1-GE, 100 KW, 250V DC

In addition to above we have a large quantity of other mining equipment, including new bins, skips & cages, pumps, rock drills, blowers, safety lamps with charging equipment, change house lockers, motors, transformers, electric cable, telephones, etc. Also large warehouse stock. Complete lists furnished upon request.

## CONSOLIDATED COPPERMINES CORPORATION

Kimberly, Nevada



## NEW METHODS - NEW EQUIPMENT

### FREE MANUFACTURERS' LITERATURE

**LOCKNUTS AND LOCKWASHERS:** Link-Belt Company announces the manufacture of a line of bearing-positioning locknuts and lockwashers, specially designed for effectively locking the various makes of ball and roller bearings.

**FLOTATION:** The first detailed literature on the Fagergren Flotation machine has just been issued by the Western Machinery Company in the form of a descriptive catalog available upon request.

**IDLERS:** For complete details on the Rex antifriction idlers and the many other idlers in the complete Rex line, manufactured by Chain Belt Company, write for your copy of Bulletin 465-R.

**LINE OILER:** The Gardner-Denver LO12 automatic line oiler can be used for any tool using 25 to 500 cu. ft. of air per minute. When it runs out of oil, it automatically shuts off the flow of air through the line. Write today for complete information.

**SYMONS CONE CRUSHERS:** The crushing action of Symons cone crushers differs from all conventional types of gyratory crushers by combining smashing impact, high speed and wide throw to produce greater quantities of finely sized products, within closer control limits, with trouble-free operation. Nordberg Manufacturing Company. Write for complete details on the Symon Cone Crusher as well as other mining machinery.

**SYMONS CONE CRUSHERS:** The crushing action of Nordberg Manufacturing Company's Symons cone crusher differs from all conventional types of gyratory crushers by combining smashing impact, high speed and wide throw to produce greater quantities of finely sized products, within closer control limits, with trouble-free operation. Write for complete details on the Symons cone crusher as well as other Nordberg mining machinery, including primary jaw and gyratory crushers, grizzlies, screens, grinding mills, feeders, hoists and Diesel engines. Write for complete details.

**STOPPERS:** The Joy Manufacturing Company has a complete line of stoppers, including the "Silver-streak" 8-91 stopper, equipped with "thumb-flip" safety rotation control and the patented Joy dual valve. Four other models include the exclusive Joy "safety" stopper for drilling in dangerous places.

**BULDOZERS:** Write for complete information on Le Tourneau's rubber-tired Tournadozer and the other types of earth handling equipment.

**AUTOMATIC COUPLERS:** Circular No. 1746 and No. 5240 contain details on application of Willison automatic couplers to your cars and your jobs to enable you to handle more tonnage per day with maximum safety. Write MINING WORLD for details.

**CLASSIFIERS:** Just off the press is Bulletin No. 48, containing complete details of the Atkins classifiers manufactured by Colorado Iron Works. Write for your copy today.

**CRUSHERS:** Data concerning the Allis-Chalmers Hydrocone crushers are contained in a new bulletin, O7B7145A, copies of which are available upon request.

**CLASSIFIER:** Deister Concentrator Company's Bulletin No. 210 covers Concoco SuperSorter. Write for your copy.

**SINKER DRILL:** Write for Bulletin SP-8009, which will give you complete information on the Chicago Pneumatic Tool Company's CP-59 sinker drill, and is recommended for holes up to 25 feet.

**CYANIDATION:** American Cyanamid Company announces its most recent technical publication, "Mineral Dressing Notes," Number 17, entitled "Chemistry of Cyanidation." This new issue in their series of technical publications is organized in four sections: Fundamentals of Cyanidation, Zinc in Cyanidation, Copper in Cyanidation and Iron in Cyanidation. Copies are mailed free upon request.

**SHORTWALL TRUCK:** Write for Jeffrey Manufacturing Company's bulletin 825 on their rubber-tired, shortwall truck. This specially-designed truck saves time in moving a shortwall machine from room to room and in spotting it for cutting.

**MECHANICAL VIBRATING CONVEYOR:** The Jeffrey Manufacturing Company's new mechanical vibrating conveyor is described in bulletin No. 826. Send for your copy.

### Marion Names Lashey to Key Engineering Post

Promotion of Merle V. Lashey to the position of assistant chief engineer in charge of large shovel design is being announced by Marion Power Shovel Company of Marion, Ohio. Mr. Lashey, who succeeds the late Glenn B. Heffelfinger, will direct design and engineering work on the Marion Type 5323 and 5561 shovels and the Type 7200, 7400 and 7800 walking draglines.

Associated with Marion Power Shovel Company for 31 years, Mr. Lashey has a varied background in excavator design. He is a registered mechanical engineer and attended the Ohio Mechanical Institute in Cincinnati.

### Exhaust Heated Rear-Dump Bodies on Euclid Trucks

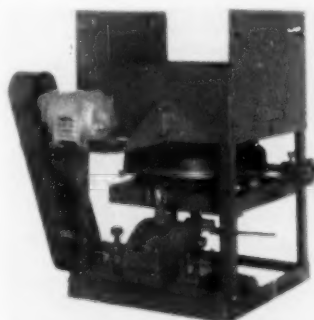
Freezing and caking of material in dump bodies is a common occurrence during winter hauling operations. Dumping of these loads becomes difficult, resulting in lost time and increased costs.

For over a year Euclid Road Machinery Co. has furnished units with heated rear-dump bodies to mine operators on the Iron Range in Minnesota. These "Eucs" have proved very successful in dumping their loads cleanly even in the lower temperature ranges.

Hot exhaust from the engine manifold is transferred through a flexible metal tube to the inlet in the bottom of the body. The double wall construction of the bottom, front, and the lower portion of the sides allows the gas to circulate freely and be exhausted through a vent in the side.

In localities that necessitate hauling during rainy seasons or jobs that require hauling of wet, sticky loads, the heat will dry the material in contact with bottom and sides sufficiently so that it readily sheds from the body when dumping.

Heated bodies are now optional equipment and are available on all Euclid Rear-Dump models, ranging from 10 to 34-ton capacities.



Dorrro-Pan American jigs have been widely adapted for all types of placer operations.

### Dorr Offers Pan-American Jigs for Variety of Ores

The Dorr Company has acquired the Pan American jigs and is now supplying them as the Dorrro-Pan American Jigs. Originally developed as a gold-saving device for dredges, the simplicity, ease of operation, efficiency, and negligible maintenance of these jigs has resulted in wide adoption on all types of placer operations, in the closed grinding circuits of gold mills, and on many applications where a coarse bed concentrate is separated from the ore gangue.

The distinctive rocker drive of the Dorrro-Pan American Placer Jigs results in lowered head room requirements. In the two-cell unit the rocker drive becomes a balanced drive, and the see-saw action results in material power savings. Because the jig screen area is essentially equal to the plan area of the machine, the capacity per square foot of floor space is very high, a decided advantage where installation space is limited, as in a closed grinding circuit.

Diaphragm wear is reduced to a minimum by use of an annular diaphragm which is subject only to rolling flexure.

For large scale operations, as in the treatment of iron ore, the jigs may be assembled in blocks of four or eight cells, with multiple unit drives.

## New Diesel Portable Air Compressor

For users who prefer full diesel-engine drive for their portable compressors, a new 500-cfm Mobil-Air has been announced by Ingersoll-Rand. The engine is the well-known International Harvester heavy duty UD-24 which starts easily as a low compression gasoline engine and after a short warm-up period is shifted to full diesel operation by means of a single lever.

This portable, known as the IKA-500, has all the features used on Ingersoll-Rand's KA-Series Mobil-Air compressors in sizes from 105- to 500-cfm. The new floating-speed regulator slows down the compressor to the lowest practical working speed that compresses just enough air to hold the pressure. This results in greater fuel savings and higher average air pressures. Full 500-cfm capacity is delivered at rated 100 psi pressure. Other features include two-stage air-cooled compressor, Hydro-Shift Flex-Disc clutch, channel valves, and sturdy running gear and mountings. In addition, the compressor is said to have a new more efficient air cleaner which is easier to service.

For additional information on this new Mobil-Air write: Mining World, 121 Second Street, San Francisco 5, Calif.

## Dow Magnesium Products Warehoused by L. A. Firm

The Dow Chemical Company has announced the appointment of Reliance Steel Company, 2068 E. 37th Street, Los Angeles, Calif., to warehouse magnesium wrought products effective January 9, 1950.

This move, Dow's first venture into warehousing of magnesium, is expected to be the forerunner of a nationwide service. The West Coast, as represented by Reliance Steel Company, was selected as the first area to be served in this manner because of the distance from the manufacturing mills at Midland, Michigan, and the difficulty of offering satisfactory service on small orders.

Initially, Reliance Steel Company will warehouse a limited supply of typical extruded rods, bars, and shapes. Other wrought products will be added to this stock as they become available.

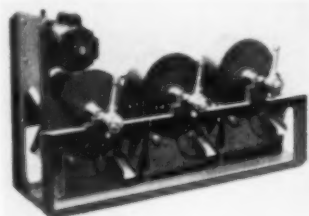
## New 45-Lb. Class Sinker Drill Announced by G-D

A new 45-pound class sinker of advanced design has just been announced by Gardner-Denver Company, Quincy, Illinois. Known as the S48, this new sinker is said to have superior drilling, rotating and hole-cleaning characteristics that make it especially suitable for use with modern tungsten carbide rock bits.

Performance tests show that the S48 Sinker equals most 55-pound drills in drilling speed and rotative power, according to reports from the manufacturer.

Designed for either wet or dry drilling, the S48 can be changed from wet to dry or to automatic air-operated water control merely by changing the easily removed gland and tube. The conversion is made without taking the drill apart, and without changing the backhead.

Further information on the new S48 Sinker can be obtained by writing: Mining World, 121 Second Street, San Francisco, Calif.



New magnetic separator developed for treatment of taconite ore and magnetic cleaning of heavy media.

## Jeffrey Announces New Lab Magnetic Separator

A new laboratory unit, employing the patented Jeffrey-Steffensen counter-flow principle of magnetic separation, has been developed for the treatment of finely ground magnetic iron ore by the Jeffrey Manufacturing Company, Columbus, Ohio. It is stated that these separators are being used in the treatment of low grade iron ore—Taconite—in Minnesota, and on eastern magnetite. They are used also for the recovery of magnetic media in the heavy media processes. In this latter application the magnetic separator is particularly helpful in the prevention of an accumulation of slime in the media.

### Features:

Unit is available in 1, 2, 3 or more sections. A type 125 three-drum laboratory size separator is shown.

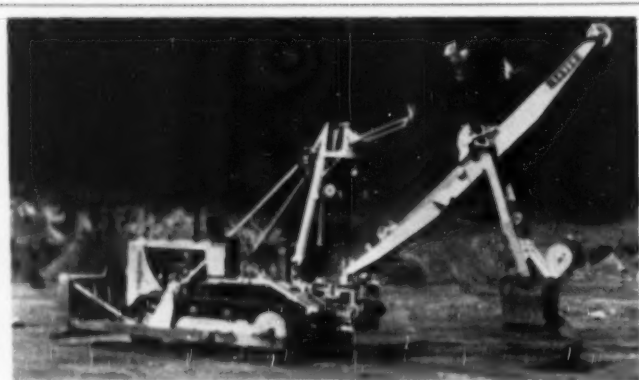
Each section is integral being independent of other sections except for the drive. All sections are interchangeable.

In the laboratory it is possible to remove one or more sections—any number of sections can be used for any given test.

The driving gear motor is mounted above the level of the drums themselves so that it is out of all possible splash.

A removable plug in the bottom of each section provides a means of cleaning out the material from the machine at the end of each test.

Complete information may be had by writing the Jeffrey Mfg. Co., Columbus 16, Ohio.



## VERSATILE MACHINE AROUND MINES

A one-half cubic yard capacity shovel front is now available for the Hyster tractor-mounted Hystaway. The addition of this attachment brings the number of interchangeable Hystaway variations to seven, other options being a crane, dragline, clamshell, hoe front, bulldozer and pile driver.

Designed only for the "Caterpillar" D7 and D8 track-type tractors, the shovel front may be mounted on either new or used machines without major alterations. Utility use of the bulldozer is retained with the complete Hystaway installed, and it takes only one hour to dismount the Hystaway to allow full production bulldozer use.

Features of the unit include ample power, fast swing, long reach, and absence of tail swing. Because of the maneuverability of its tractor base, the excavator can get into and work jobs difficult for the average shovel to handle. It is well adapted for such jobs as road grading, gravel pit excavation, loading in stone quarries, excavating basements and foundations, excavating in borrow pits, railroad grading, and airport grading.

Specifications for the new attachment may be obtained by writing Mining World, 121 Second Street, San Francisco, California.

# MINING MEN AND THEIR ACTIVITIES

About men who are well known and prominent  
in American metal mining circles

Eugene Hogan has succeeded William J. McMahon, retiring labor commissioner for the Anaconda Copper Mining Company. Hogan was formerly assistant general superintendent of mines.

L. C. Jones is now assistant chief engineer of Kennecott Copper Corporation's Utah Copper Division. Jones' former post as mine engineer will be filled by Charles J. Sax.

James L. Taylor has left his position as chief engineer for the potash mine and refinery of International Minerals & Chemical Corp., Carlsbad, New Mexico, to become construction engineer for the entire corporation.

Frederick F. Kett is retiring after twenty years association with the Vanadium Corporation of America—the last twelve years as general manager of the Mining Division. He will continue as mining consultant, however, with a temporary address at 75 Crescent Drive, Sausalito, California.

John Hamm, president of the John Hamm Mining and Milling Company of Center, Colorado, was re-elected president of the Colorado Mining Association at its 33rd annual convention.

James O'Brien has been transferred from Shoshone, California, to Carthage, California, where he will be foreman of the Olancha Clay Mine, which is being operated by the Sierra Talc and Clay Company of 5509 Randolph Street, Los Angeles.

ROY B. JOHNS has been made a vice-president of the Freeport Sulphur Company, Freeport, Texas. Johns has been assistant vice-president since 1930. He will remain in the New York office.



C. V. O. Hughes, Jr., formerly assistant operations manager for Dicalite Division of Great Lakes Carbon Corporation, is now production manager for Quincy Corporation, Quincy, Washington, a company engaged in the mining and processing of diatomite in the Quincy area. Hughes has been in the operational end of diatomite mining and milling for eight years.

J. Bruce Clemmer, mineral technologist with the Bureau of Mines, has been reassigned to the Bureau's Southwest Experiment Station at Tucson, Arizona. At the time of the Bureau's reorganization last fall, Clemmer was appointed regional director of the Southeast Division with headquarters at Tuscaloosa, Ala-

bama. His new address is Box 4097, University Station, Tucson, Arizona.

C. G. Wheelchel, for 10 years superintendent and manager for the Bonanza Mines, Inc., of Sutherlin, Oregon, a quicksilver mine, is engaged in logging and sawmill interests now since the shutdown of the Bonanza because of low metal prices.

D. W. Work, metallurgical (mill, mine and smelter) designer and draftsman is living at Lamar, Missouri, until he finds a new position in the mining business.

Lloyd Pollack is working for The Anaconda Copper Mining Company, Butte, Montana, as a trainee in the company's mine supervision training program.

Robert W. Pullen, senior in mining engineering at Montana School of Mines, Butte, Montana, has been given the \$300 award offered by the American Smelting and Refining Company for his high scholastic standing. Everett Owen Bracken, 1949 graduate of the School of Mines, had his paper, "The Christensen Sillimanite Deposit Southeast of Dillon, Montana," chosen as one of the three best entered by undergraduates in the National Student Prize Competition sponsored by the American Institute of Mining and Metallurgical Engineers. He is employed by the Silver King Coalition Mines Company, Salt Lake City, Utah.

Robert M. Wigglesworth, who has been chief engineer at the Bristol silver mines, Nevada, for the past three years, has joined the staff of the Combined Metals Reduction Company at Pioche, Nevada, as chief chemist.

R. M. Snyder of the Union Engineering Company has just returned to Los Angeles from a trip to Arizona and Nevada, where he examined mines on behalf of the Zenda Gold Mining Company.

Sinclair B. McCoy has been appointed assistant to A. Norman Into, vice-president in charge of the potash division of International Minerals & Chemical Corporation, Chicago, Ill.

Elmer J. Olson, assistant superintendent of Oliver Iron Mining Company's Soudan mine, Minnesota, has been transferred to the Fayal open pit and underground operations. Earl M. Holmes has been promoted to assistant superintendent of the eastern district in charge of the Soudan mine. His position had been general underground mining captain in the Eveleth-Virginia district. Fred D. Hoover, Jr., has been promoted from mining captain to general mining captain at the Fayal mine. At Oliver Iron's Hibbing-Chisholm mines, Ewald V. Nelson, general pit fore-

man, has been promoted to assistant superintendent. He is assigned to the Morris and Pillsbury mines. In the Canisteo area, H. F. Bolton has been made assistant superintendent of the Arcturus and Gross Marble mines. He had been general pit foreman.

John L. Bolles is living at 306 West Fifth Street, Anaconda, Montana. He is assisting research engineer for Anaconda Copper Mining Company.

John F. Hatch has been transferred to Mulberry, Florida, by International Minerals & Chemical Corporation. He is assistant mine superintendent.

R. H. BASSETT, chief engineer for the M. A. Hanna Company, Duluth, Minnesota, for the past 32 years, has retired but will continue as consulting engineer for the company.



Conrad Hoff, mill superintendent of the Pend Oreille Mines & Metals Company, Metairie Falls, Washington, recently retired because of ill health. He is succeeded by J. C. "Jack" Crampton who has worked in the Metairie District for over twenty years.

David Hartley has been appointed assistant superintendent at the Oliver Iron Mining Company's Spruce mine near Eveleth, Minn.

Leslie Belton recently received his Master's Degree in Geology from the University of Virginia, and is now associated with the Pend Oreille Mines and Metals Company.

## Obituaries

J. H. C. Waite, 61, president of the Mining Corporation of Canada, Ltd., Quémont and Normetal Mining Corporations and a director of Hollinger Consolidated Gold Mines, Ltd., Hudson Bay Mining and several other mining companies, died January 2 at Toronto, Ontario.

John A. O'Neill, assistant in the research engineering department of the Anaconda Copper Mining Company, Butte, Montana, died January 19.

Mrs. Mae Paula Monat, 67, trustee for the well-known Mouat chrome and nickel mines near Nye, Montana, died January 1.

R. P. Weidenfeller, 63, chief engineer for the Oliver Iron Mining Company, died January 28 at Coleraine, Minnesota.

Fremont F. Fraser, 58, long associated with mining enterprises in Idaho's Coeur d'Alenes, died January 6 at Long Beach, California.

## **AMERICAN ZINC, LEAD AND SMELTING COMPANY**

Buyers of Zinc Concentrates  
Suitable for Smelting in Retort  
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Owned and Operated by

**Bunker Hill & Sullivan  
Mining & Concentrating  
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Location: KELLOGG, IDAHO  
[R. R. Station: Bradley, Idaho]

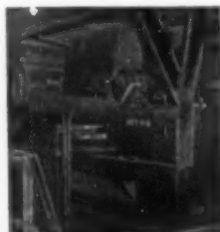
Purchasers of GOLD, SILVER and LEAD Ores.  
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A self-contained conveyor  
feeder scale that feeds  
weighs, totalizes and regis-  
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for better control of ball mill  
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## precipitates—ROCKY MOUNTAIN

### New Showing and New Shaft at Utah Mine

A mineralized zone has been found on the 350' level of American Fork Consolidated Mines Company's property in American Fork Canyon, Utah, and shows values in gold, silver and lead. Though not of commercial grade, the find is an encouraging sign that a large orebody may be encountered. The showing was uncovered by a crosscut which was being driven from the new development shaft toward the Pacific vein, a substantial producer in other parts of the mine, and further exploration is under way.

Meanwhile, most of the mine's activity is centered on sinking the new shaft an additional 80' to intersect the Pacific vein again. Recently installed pumping equipment is in operation and has facilitated greatly the progress being made in the program, according to Douglas Nielsen, mine superintendent.

COLORADO

Al Goodwin of Goodwin Gold Mines has leased the School Section mine on the north side of Bull Hill, Cripple Creek, Colorado. He has begun rehabilitation of the shaft and will start development on the fifth level as soon as possible by extending a drift 1,000' along a black basalt dike.

Exploration and development at the Fortune mine is being pushed by the Clark-Mackey Company, Leadville, Colorado, headed by Paul R. Clark and Richard E. Mackey. The company leases the Fortune from the James McNeece estate. Operations in the Kokomo district, where Clark-Mackey have another lease, have been discontinued temporarily.

A station is being cut on the 1,150' level of the Forest Queen mine, Cripple Creek, Colorado, by Champion Mines Company. Lateral development is to begin in the Forest Queen, the Jerry Johnson, the Monrose and the W P H claims. All properties should be ready to produce in about a year.

Silver Bell Mines Company has installed a new Gardner-Denver 1,140 cu ft. air compressor at the Silver Bell mine, Ophir, Colorado, in order to increase production and development, and has begun operating a new washing-sorting plant. Capacity of

the mill is now about 200 tons per day. The mine produces gold, silver, lead and copper ore, taken mainly from stopes on the Butler and Ida veins. An attempt to recover tungsten as a by-product also is being made. Diamond drilling, drifting and raising on the new Lookout vein is under way. Further exploration of virgin areas south and east of present operations and at depths of 1,100 to 2,000' is planned.

Two diamond drills are being used to explore for orebodies in Smuggler Mountain at Aspen, Colorado, where the Aspen Mining Company is developing numerous claims. Aspen is under control of Anaconda Copper Mining Company and Humphreys Gold Corporation of Denver. F. W. Anderson, manager of Aspen, said that churn drilling under contract to Winninger Bros. of Arizona, and core drilling under contract to Sprague and Henwood of Scranton, Pa., is under way. Underground development so far has been in Smuggler No. 1 and Smuggler No. 2 tunnels, and in the lower Durant tunnel on Aspen Mountain.

William R. Shaw and D. K. Shaw

are developing the Dorothy Louise and Ruby mines in Lincoln Gulch, near Aspen, Colorado, and have ordered compressors, rails and pumps to be installed to carry on an extended program this summer. The tunnel in the Ruby mine has been cleaned out and sinking operations will begin shortly. A good silver-bearing showing has been discovered in the Dorothy Louise.

SOUTH DAKOTA

The annual report for 1949 released by Homestake Mining Company, Lead, South Dakota, shows gains in revenue and tonnage over 1948 figures. Net income was \$2,869,446 compared with \$2,445,868 in 1948. Total tonnage treated was 1,112,183 compared with 896,862 in 1948. Bullion valued at \$15,683,158 was produced, an average of \$14.10 a ton with metallurgical recovery of 96.98 percent, the highest recovery ever made by the



### GOLD PINCH HITS FOR ZINC AND LEAD

The above aerial view shows Utah's New Park Mining Company's property at Kestley. The mine was closed down for three months at the end of last year but is now back to nearly normal operating capacity. According to W. H. H. Cranmer, president and general manager, operations are continuing on the Pearl fissure on a main heading, and gold-bearing ore is being mined rather than the lead and zinc ordinarily recovered, but too unprofitable to recover at present. The station being cut on the 1,500' level is well under way. A 900' drift is to be driven from that level and will extend both to the Pearl fissure and through the Galena-Mayflower fissure. An increase in tons produced per man hour has been evident since the reopening.



company. In 1948 bullion value was \$12,658,139. Guy N. Bjorge, general manager, said 1950 output is expected to increase to 1,400,000 tons of ore, nearly the post-war production.

Reopening of the *Holy Terror* gold mine at Keystone in the Black Hills of South Dakota is planned in the near future, according to George E. Flavin, secretary-treasurer of the company. Cost of getting into production will be about \$50,000. Fifteen men will be employed to do the initial dewatering and repair work. After production starts, about 50 men will be employed. The mine first was worked in 1895 and is named for the discoverer's wife. From 1903 to 1938 it was closed because of litigation. In 1942 it closed again because of L. 208. During the producing periods the company made approximately \$3,000,000. Flavin and William P. Lane, governor of Maryland, are the principal owners of the company now.

UTAH

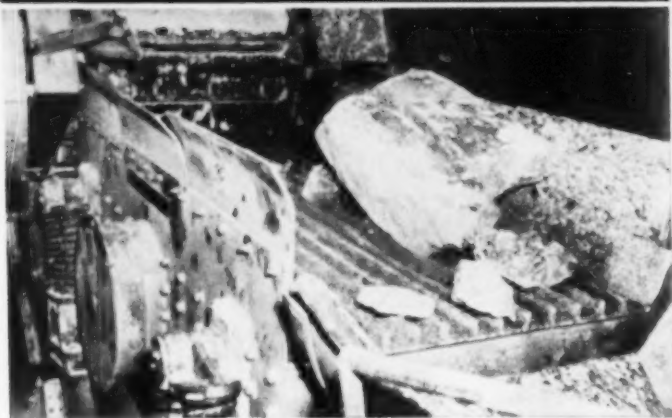
Development of the silica deposits in Parowan Canyon, northeast of Parowan, Iron County, Utah, is planned by the newly formed company, *Western Glass Corporation*, headed by E. Meeks and William Carlyle Dalton. Although no date for the beginning of operations has been set, a mining program has been outlined and plans for the location and building of a glass processing plant are being made. The company controls 32 claims in Main Canyon, Second Left Hand and First Left Hand Canyons. Unlimited amounts of sand are available, according to engineers, and of a quality well suited to glass manufacture.

*Cordill Mining & Milling Company*, Alta, Utah, has been shipping approximately 50 tons of lead-silver ore daily from its various leases. Ore has been opened up on the 1,400 and 1,500 levels. Pumping equipment is being installed to take care of the spring runoff.

Average monthly shipments from *Chief Consolidated Mining Company's* properties at Eureka, Utah, have been 12,000 tons of zinc-lead ore. The company reports diamond drilling and drifting on the *Longyear-Consolidated Goldfields* lease.

*Silver King Coalition Mines Company* lost \$406,413 on last year's operations, according to its annual report, issued at Salt Lake City, recently. The mine shipped 23,829 tons of ore in the first half of the year, and was closed because of low metal prices the remainder of the year. At present, company officials are attempting to work out a lower wage scale with the union in order to be able to resume operations.

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### HEAVY DUTY SCALPER

Talk about performance! This Hewitt-Robins Heavy Duty Scalper is handling 5 ft. cubes of 90 lb. material—11,250 lb. lumps—at the rate of 110 tons an hour—and doing it in continuous 16-18 hour operation!

Its 2-bearing vibrator is "full floating"—no load damage to bearings or shaft. And this Scalper won't shake the building because heavy-duty coil springs, which support the frame, absorb impact vibration. A truly rugged machine for the toughest scalping jobs.

### VIBREX STYLE M SCREEN

For accurate, low-cost processing of the sizes you want, in the capacity you need, at the speed you must have. Vibrex® Screens use the "circle-throw" principle originated by Hewitt-Robins. Two positive strokes with every revolution of the counterweights. And the stroke is adjustable—at our factory or in your plant—as explained in Bulletin No. 122-B.

Made for overhead suspension or floor mounting—whichever best fits your needs.

### SECTIONALIZED CONVEYORS

Hewitt-Robins Sectionalized Belt Conveyors enable you to select a conveyor system *exactly suited to your needs* . . . in length, height, belt width and capacity. All components, including head and tail section, are Hewitt-Robins-engineered for top efficiency and low operating cost. Best of all, Hewitt-Robins makes both the conveyor machinery and the belt.

Remember—only Hewitt-Robins takes full responsibility for *all the elements* of a belt conveyor!

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MINING WORLD

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**SCREEN CLOTH**

Ore opened up in a drift from the middle tunnel of the Silver Standard Mining Company's Ophir Hill property, Tooele, Utah, is increasing in value as development continues by lessees. Recently a 40-ton car of silver-bearing silicious ore was sent to the Garfield smelter and a second car is being loaded.

According to J. F. Featherstone, president, the Commonwealth Lead Mining Company, has under option the purchase of 160 acres of uranium bearing claims in the Temple Mountain mining district, Emery County, Utah. The claims have the same geological formations as those at the Vanadium King mine, from which large shipments have been made.

The annual report from Alta United Mines Company, which has been developing its lead-zinc-copper properties at Alta, Utah, gives proposed work for the coming year, again of a developmental nature. Among the projects listed are the extension of the Quincy drainage and transportation tunnel to reach the Greeley orebody, a 150' drive, and the Wellington orebody, a 300' drive which will give 800' of back; exploration below the Dwyer tunnel for Wedge West One orebody; extension of the east drift in the Kate Hayes fissure from the Dwyer tunnel and extension of this tunnel to cut the Jones-Paddock fissure, a drive of about 100' to give 800' of back. Several other orebodies may be prospected by smaller development projects.

Seven carnotite claims are said to have been acquired by Nevada Mining, Milling and Engineering Company in the Temple Mountain district of Utah from Lawrence Migliaccio, owner.

The Atomic Energy Commission has arranged to lease the old Kalunite Building at Marysville, Utah, as a depot for the purchase of uranium ores. The American Smelting and Refining Company has been named as purchasing agent for the AEC, with Verne J. Tarne in charge. The amount of ore the depot will be authorized to buy has not been announced, nor has the minimum acceptable radioactive content of the ore been set. Several operators in the district are ready to truck ore to the depot as soon as it opens, including the Vanadium Corporation of America and D. L. Atherley from the Farmer John Claims.

**WYOMING**

Uranium is said to have been found in the Bear Lodge Mountains, near Sundance, Wyoming. According to the report, A. J. Katches, a Duluth, Minnesota, mining engineer, was studying fluorite deposits and discovered the presence of uranium.

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## precipitates—NORTHWEST

### NW Section AIME to Hold Meeting April 6

The North Pacific Section, American Institute of Mining and Metallurgical Engineers, will be hosts to the Industrial Minerals Division of the Pacific Northwest on April 6, 1959, at the University of Washington, Seattle.

The tentative program now includes papers dealing with industrial minerals in Montana, Idaho, Oregon, Washington and British Columbia, such as, "Phosphate Industry in Idaho," to be delivered by Earl W. Murphy, Boise, Idaho, and "Techniques of Identification of Non-Metallic Materials," by Dr. J. I. Miller, Seattle.

Trips to the Tacoma Smelter of the American Smelting and Refining Company and to the Bethlehem Steel Plant are being planned.



At Silver Summit Mining Company's Wallace, Idaho, property, three

drifts are in good ore. From the 3,100' intermediate level, east and west drifts have been driven in ore for over 50'. From the 3,400' level the west drift is in ore which improves in grade as development continues. In addition to the drifting program, the company is completing a ventilation raise between Silver Summit's 3,000' level tunnel and Silver Dollar Mining Company's 2,800' level. This project is a joint one to provide better ventilation for both mines.

The Whiteliff Mining and Milling Company, Clark Fork, Idaho, has leased the southern part of its silver-lead mine to Ross Roundy, Wallace mine operator. He will mine from the south orebody which is 450' from the adit portal. Exploration here consists of a 500' shaft. Roundy's lease lasts five years and extends to the 1,000' level. Whiteliff will continue working the north orebody and the mill.

Several months ago a complete examination was made by geologists of the Senator Stewart property operated by Silver Bowl, Inc., Kellogg, Idaho. On their recommendation, the company is extending a raise above the Fir tunnel in the Silver Bowl ore shoot in order to get around a fault

and relocate the urebody. A second project, also under way is that of extending the Silver Bowl west drift 250' further through the Osburn fault to connect with old Fir tunnel workings. This move is designed to cut the possible downward extension of a rich vein mined many years ago and lying at right angles to the Stewart vein.

According to Charles Reamsnyder, president of Yankee Mines, Inc., Mackay, Idaho, the company's 100-ton mill will be operating at capacity by June of this year. A year has been spent to get the mine into shape and a new vein has been opened on the 200' level with promising values. Between now and June a gradual increase in the working force, installation of ore chutes, opening of stopes and stockpiling of ore is planned. The mine property covers most of Custer Mountain and produces gold and silver. Troy Becker is secretary-treasurer; Al Guard is mining engineer; and Frank Casto, assistant.

Lucky Friday Silver-Lead Mines, Inc., Mullen, Idaho, is running its 3,000 tons of stockpiled ore through the Golconda mill, according to recent reports, and is providing an additional daily production of about 75 tons from stopes on the 1,000', 1,400' and 1,600' levels. Extension of the east drift on the 1,600' level is under way.

Gates Bros., Inc., Wendell, Idaho, manufacturer of treble superphosphate, is contemplating the expansion of its \$1,000,000 plant. The enlarging of the facilities for manufacture of high analysis (42 percent P<sub>2</sub>O<sub>5</sub>) treble superphosphate may materialize during the coming year, according to George F. Wilkins, general manager. In two or three years a sulphuric acid plant may be installed. The company began operating last year at a 100-ton-per day rate with the entire output going to the Idaho Farm Bureau. About 75 men are employed.

Palluade Mining and Milling Company expects to resume mining operations in April or early May, weather permitting, at its mine on the west fork of Pine Creek, near Kellogg, Idaho. T. W. Schmidt, president, advised that a diamond drilling program may be started then, and that drifting is to be done to cut an oxidized barite vein, expected to lie 200 feet ahead.

Five crews are carrying on development work at Sunshine Consolidated Inc.'s property, Kellogg, Idaho. Two crews have progressed 250' on a ventilation raise from the 3,100' level toward the 2,700' level crosscut. Two other crews are pushing this crosscut at a rate of 250' monthly toward an ore showing in the Yankee Girl vein structure and have completed 1,700'



### THIS JEEP DOES EVERYTHING BUT COOK

At Sheridan, Montana, Al-Con Mining and Engineering Company's most versatile piece of equipment is the jeep above, weighing two tons, with a built-in Schramm air compressor, a special winch on front, its own galleys frame, housing power for 1,200 lbs. of rock from a depth of 200' at 133 fpm, and the ability to walk away with the self-dumping bucket. The jeep has heavy overload springs and pulls a four-ton dump trailer operated from a winch. The company uses the machine extensively for prospecting, testing and road building. Recent activities of the company include the installation of heavy machinery—including a large bulldozer and shovel—for stripping operations on about 44,000 tons of shipping ore on its property at Sand Creek. The galleys frame has been completed and a shaft begun to tap ore reserves lying below present workings. Water was encountered at 20' and air pumps installed. Ore at this property carries values in gold, silver and lead, as does another new property—recently acquired near Boulder, Montana—where operations will begin some time this spring. M. R. Maxey of Billings and Jesse Malone of Agawam are owners.

out of the 2,400 necessary to reach the objective. The fifth crew is mining silver-bearing ore from a stope on the 3,100' level and is averaging six to eight tons per day. Norman M. Smith is managing operations.

## MONTANA

The *Nancy Lee* mine has resumed operation with the lessening of bad weather, according to E. G. Smith, lessee. The mill is operating on a one-shift basis, treating about 1,500 tons of stockpiled ore. New ore is being broken daily but full-scale operations will be held up until spring. The mine is at Superior, Montana.

According to E. E. Eddy, mining engineer in charge of operations, milling grade ore has been found in the Cumberland mine at White Sulphur springs, Montana. The mine is under development by Silverton Mines, Inc. The ore has been followed several feet by a drift run off a new tunnel at the 250' level. Values are in lead and silver.

A two-foot vein of gold ore has been found in the bottom level of the Golden Leaf shaft in the New York-Montana mine, Bannack, Montana. Operator of the mine is Signal Mining Company of Kellogg, Idaho. Gunnar Johnson, mining engineer, discovered the ore. The shaft was retimbered recently to allow for development, and Johnson advised that an extension of the Dunn level tunnel would reach the ore most economically and efficiently. Signal began rehabilitating the old mine several months ago.

The main crosscut tunnel is in over 1,500' at Ambassador Mines Corporation's property, Trout Creek, Montana. The objective, the Wanda vein, which contains values in gold and silver, is expected 300' ahead of the breast.

## WASHINGTON

Two old copper-silver mines, the *Turk* and the *Togo*, have been reopened and are under development by J. W. Geisbauer and J. W. Lower of Spokane. The mines are near Fruitland, Washington. Although shut down now because of weather, active work will begin this spring to put the properties on a producing basis.

The lost Lewis Sam gold mine near Adair, Washington, has been rediscovered by George Horine, who says the vein is about three to four feet wide and could become a valuable small operation. The mine was operated before 1920 by an Indian and his partner.

The University of Washington,

Seattle, is offering five fellowships in the School of Mineral Engineering for research in coal and non-metallics in cooperation with the U. S. Bureau of Mines. The term of the fellowships is one year starting July 1 or September 1, and they will be given to graduates, who are qualified to undertake investigations of a research character. The investigations consist principally of laboratory work to be done on various problems of the Bureau in the treatment and utilization of coal and the beneficiation of industrial minerals and ceramic materials. Applications should be received at the school before May, according to Drury A. Pifer, director of the School of Mineral Engineering.

Besides these fellowships, several others are offered, one in ceramic engineering and several Engineering Experiment Station Fellowships in metallurgy and ceramics.

Shareholders of Sterling Zinc-Lead Company, Metaline, Washington, which owns claims leased to and operated by Metaline Mining and Leasing Company, are being asked to disincorporate and transfer three shares of Sterling stock for one share of Metaline stock. B. J. Lindsay, secretary for Sterling, said that his company was not large enough to carry on operations alone and felt that continued operation by Metaline under the new set-up would be a profitable move.

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## precipitates—CENTRAL and EASTERN

### New Company Formed to Distribute Titanium

The Titanium Metals Corporation of America has been formed by the Allegheny Ludlum Steel Corporation and the National Lead Company, New York. The new corporation has been set up especially to distribute titanium metal and its alloys.

Allegheny and National Lead will produce the finished metal in alloys for Titanium. No prices have been determined yet for the finished metal as production costs have only been estimated. Ore for processing will come from National Lead's titanium oxide mines in New York and Norway and from Indian imports.

Officers of the new company include H. C. Wildner, president, who is also vice-president of National Lead, Clark W. King, vice-president, who is a vice-president of Allegheny, and A. H. Drewes, secretary-treasurer.



Eagle-Picher Mining & Smelting Company announces that its Illinois mines, which started operations in April of 1949, produced ores which yielded 7,242 tons of concentrate in 1949. The Tri-State Mining and Smelting Division boosted its ore production and custom ore treatment to 2,618,917 tons from the 1948 figure of 2,091,790 tons.

The Ozark Ore Company, which is an M. A. Hanna Company operating subsidiary, is deepening the vertical shaft at its property near Iron Mountain, Missouri. The shaft will be used to mine ore from deep levels to take the place of ore from nearly exhausted open pits. Production from the underground mine will be milled at Ozark's present iron ore jacking plant.

Uranium metal produced by Mallinckrodt Chemical Works, St. Louis, Missouri, will be sold under AEC supervision to restricted and qualified licensees at \$50 per pound. Today's move to free uranium metal for industrial and scientific uses follows the commission's announcement of November 30 that broader usage of atomic materials will be allowed. Nine chemical companies have been named to market the metal, which is sold in pencil-sized rods about four inches long. Eight industrial companies (including universities) were granted permission to use the mate-

rial; the greatest single use is that of shadow-casting specimens for study under electron microscopes.



Skidoo Brothers of Virginia, Minnesota, shipped 85,461 tons of ore from the Ajax mine at Biwabik in the 1949 season.

The M. A. Hanna Company is doing winter stripping at two Cuyuna range mines, the Portsmouth and the Onondaga, and nine Mesabi mines in Minnesota. From the Morton, one of the Mesabi mines, more than 90,000 cu. yds. were stripped during January. The Morton is the latest and, perhaps the most difficult of underground mines to become an open-pit operation. The overburden is heavy and the mine, during its brief active life, was very wet. As reported before, the big dragline from the South Agnew operation is expected to be moved soon to the Morton. L. M. Bredvold is superintendent.

The application of the Erie Mining Company and Pickands Mather & Company for water rights to operate the taconite processing plant at Aurora, Minnesota, asks the right to make a channel between Colby and Whitewater lakes (Upper & Lower Partridge lakes), rights to construct retaining dams and to pump water

"not to exceed an average of 12,000 gals. per minute." Because of the large amount of water required, the matter of a sufficient supply will be very important in determining the location and operation of future taconite concentration plants.

The M. A. Hanna Company mines on the Menominee range of Minnesota are busy with winter development and mining ore to build up stock piles. The shaft deepening at Hiawatha No. 2 has been completed to the 19th level. The mine is connected underground with Hiawatha No. 1. A new level is being developed at the Wauasca mine and underground exploration work is under way at the Tully property, through the Bengal mine shaft.

The Cleveland Cliffs Iron Company reports as of January 26, 1950, that the approximate number of hourly paid employees in its Michigan and Minnesota mines was 3,684. The company also reported the increase from five work days to six days at the Shaft mine, in order to meet the greater demand for lump iron ore.

At the Jones & Laughlin Ore Company's Vicar mine, near Wakefield, Michigan, the 24" belt conveyor for transferring ore from the headframe to the transfer tower is now in operation. The use of a conveyor kept the headframe height at a minimum, materially reducing its cost. The conveyor is on a sixteen degree incline to the tower. It is loaded by a horizontal pan feeder and travels at 450' per min.



### ALUMINUM CAPACITY—144 MILLION LBS.

Reynolds Metals Company recently bought the Jones Mills, Arkansas, aluminum reduction plant which it had leased from the government since 1946. The plant has four pot lines, each capable of producing 36,000,000 lbs. of aluminum per year, or 144,000,000 lbs. per year collectively. Only two of the four pot lines operated until recently, as sufficient electric power was lacking. The plant has 68 large engine-generator sets capable of supplying 78,000 kilowatts of electric power, enough for two pot lines. A year ago power from the Arkansas Power & Light Company was obtained to start the third pot line. In August strikes shut the plant entirely, and in September only two lines were re-activated. Last month electric power from the new Lake Catharine Power plant was obtained and capacity operations are beginning.

## precipitates—SOUTHWEST

### Nevada Mag Plant Becomes Versatile Producer

Facilities and land from the Basic Magnesium Plant at Henderson, Nevada, have been leased to three operating members of the mineral industry. Acquisition of the plants was made economically possible by arranging for low-cost power from Hoover and Davis dams. The following companies will be involved:

Combined Metals Reduction Company will acquire unit 10 at BMI, plus 50 acres of nearby land for use in electro-reduction of the complex oxide ores from the Pioche district. These ores, long a riddle to metallurgists, will be upgraded at a 330-ton mill at Caseiton, Nevada, then sent to the BMI plant for extraction of lead, zinc, manganese, gold, and silver values. Combined Metals has worked on the refractory Pioche ores since 1934; solution of its problem will be these new plant facilities.

National Lead Company will acquire units eight and nine at BMI, plus 50 acres of land for use in processing lead and titanium pigments.

Harvey Machine Company of Torrance, California, will purchase two plant sites at BMI, a total of 200 acres of land, and then will spend \$50,000,000 in the construction of a single-pot aluminum-production line.

Among the men who closed the negotiations were Governor Vail Pittman of Nevada, E. H. Snyder,

president of Combined Metals, J. H. Reid, manager Titanium Division, National Lead Company, and M. E. Darkenwald, assistant to the president of Harvey Machine Works.



Caving and open-pit operations by Kennecott Copper Corporation at Ray, Arizona, are accounting for a monthly production of 165,000 tons of copper ore, compared to 135,000 tons monthly reported last fall. The resumption of the 48-hour work week is largely responsible for the increase in production. At present, the mine crew consists of 475 men and all operations are on a three-shift basis. Robert W. Thomas of Ray is general manager.

Mining operations are continuing from the 1,900' to the 4,500' levels at the United Verde Branch, Phelps Dodge Corporation, Jerome, Arizona. Production is averaging 30,000 tons of copper and zinc ore monthly. The mine crew of 400 men works on a two-shift basis. C. E. Mills is general superintendent.

The Rainbow Onyx Company, 3210 South Nineteenth Avenue, Phoenix, Arizona, has been organized to conduct onyx mining and processing operations. The company is headed

by F. L. Everhart, 4311 North Seventeenth Avenue, Phoenix. Others interested include Archie T. Hogan, vice-president; Robert B. Katson, secretary-treasurer; Harold O. Waggoner, attorney; and James W. McLaughlin, auditor—all of Albuquerque, New Mexico. The firm is installing sifting, sawing and polishing units and a warehouse in Phoenix and expects to be turning out onyx flooring, wall paneling and ceiling covering shortly. The raw material will be quarried at the Cave Creek onyx mine purchased about a year ago from T. C. McReynolds of Phoenix. A commissary, dining hall and barracks are to be constructed at the quarry site, where 20 men will be employed.

A carload shipment of lead-silver-copper ore has been made by the Mary G. mine, near Amado, Arizona. The mine is operated under lease by H. O. Nygaard and Henry Worsley, Ruby Star Route, Box 49, Tucson, Arizona. Early this year Nygaard expects to start some diamond drill work at the property.

The Golden Crown Mining Company, operating the Tiger mine at Crown King, Arizona, is employing 8 men on a two-shift basis. The winze has been sunk an additional 75' and a drift is being run along the vein. H. B. Salisbury is superintendent of the company.

Work has been started at the Mica Hill property in Moss Canyon, near Kingman, Arizona, according to the owner, Frank Merlo of Los Angeles, California. The road to the mine is being repaired and the millsite cleared in preparation for the installation of a milling plant. G. F. Simmers of Santa Ana, California, is supervising the work. H. A. Lackey of Kingman is manager.

The Lucky Tiger Combination Mining Company is maintaining production at the rate of 150 tons of copper ore monthly from its holdings in the Seneca district of Yuma County, Arizona. Mining is by room and pillar methods from workings on the 100' level. E. J. Stanley of Parker is manager. W. W. Harriett is superintendent.

Twelve men are employed by Desert Lead Company, Inc., in the rehabilitation of the old Rialto mine in the Castle Dome district of Yuma County, Arizona. Broken timbers are being replaced and levels cleaned up in preparation for mining on the 400' level. Values are in lead and silver. President and manager of the company is W. D. Morrison of Yuma.



### CALIFORNIA MINING PLANNERS MEET

On March 7, the first day of the California Division of Mines' open house, the State Mining Board held its fourteenth regular meeting in the Ferry Building at San Francisco. MINING WORLD'S reporter took the above picture at the close of the Board meeting. William Wallace Mein, Jr., Board member and Vice-President of Calaveras Cement Co.; Olaf P. Jenkins, Chief of California Division of Mines; Warren T. Hannum, Director of Natural Resources; P. R. Bradley, Chairman of Board and President of Mother Lode Mining Association; George W. Hallock, Board member and President of California Hydraulic Mining Association; with business for the day finished, the topic of conversation has lightened—what did plaster recently torn from gold-handling room in the mint assay?

Fred and Charles Gerold, 2720 Sunset Villa, South Sixth Avenue, Tucson, Arizona, have leased the Calomina Mine and started development work. The property is owned by Antonio Zamboni of Marana, Arizona. An inclined shaft is being sunk and some drifting and crosscutting is under way. Values are in lead, silver, and copper. Six men are employed.

Burney Mines is working the Birth-day property, a group of 21 claims in the Old Hat district of Pinal County, Arizona. The face of the tunnel has been advanced about 100' and about 250 tons of copper, gold, silver, lead ore is produced monthly. Four men are employed. R. A. Burney and C. L. Burney of Tucson are manager and superintendent, respectively.

About 65 tons of asbestos ore are being produced monthly from the Bear Canyon asbestos claims on the San Carlos Indian Reservation. Three tunnels have been driven to develop the property and mining is from room and pillar stops. The Bear Canyon is worked under lease by R. G. Robertson, 1417 East McDowell Road, Phoenix, Arizona.



A new lead-silver vein has been opened up by the Lippincott Lead Company at its Death Valley, California, mine. The company has been smelting its own lead ores for the past three and a half years at its Santa Ana plant and uses the refined metal in the manufacture of storage batteries. A crew of 48 men is employed at Santa Ana besides several miners at the mine. In order to increase production, a new lead smelter is to be built at Mojave this spring. Gene Taylor is mine superintendent, Neuman Belk is smelter superintendent, and George Lippincott of Santa Ana is owner of the properties.

The Annual Jumping Frog Jubilee and 39th District Fair will be held at Frogtown, a mile from Angels Camp, Calaveras County, California, May 19, 20, and 21. The mining section will have modern and early-day machinery in operation and specimens of all minerals in the county—over fifty—will be exhibited. These will include a pocket of newly mined gold, valued at \$90,000.

The old Marble Springs gold mine, once a rich producer, is being readied for production by a crew of 15 men working on a two-shift basis with Click Henderson in charge. The mine is 13 miles east of Coulterville, Mariposa County, California. In the spring an 80-ton mill is to be installed. The shaft has been sunk 100' deeper and two drifts will be run from the bottom. About 500' north of the shaft an 80' winze cuts a large gold-bearing vein, from which development ore is being taken.

William F. Smith of Anaheim, California, is getting a crew together to start development of his eight gold claims in the Joshua Tree National Monument. He will sink a 100' shaft as the first phase of the project.

Placer equipment has been set up by K. J. Kennedy and his associates to work gold deposits in the Scott Bar district of Siskiyou County, California.

Siskon Mining Corporation is diamond drilling at its property southwest of Happy Camp, Siskiyou County, California, and has discovered copper-gold ore in quartz gangue in shear zones at its Dillon Creek property. The company has completed a new road to its property and is also prospecting with a bulldozer on a gossan outcrop.

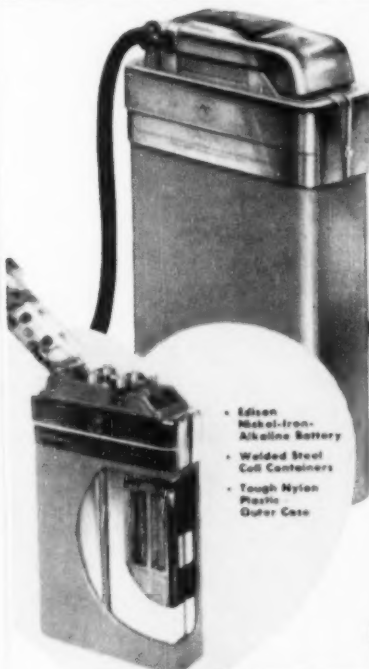
A gold-bearing vein has been exposed by bulldozing operations at eight different points over a distance of 1,600' by Peerless Development Company at its property near Greenville, Plumas County, California. The Peerless Company holds seven claims in the area. B. K. Melville is president and general manager of the company, and he also owns several adjoining claims called the Gold Stripe group. Before sinking on the Peerless vein further stripping will be done.

Although Idaho-Maryland Mines Corporation, Grass Valley, California, reported a net loss of \$15,000 after depreciation and depletion allowances from its 1949 operations, new orebodies discovered during the year by diamond drilling may put the

Continued on Page 68

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## Lost Dutchman

*Continued from Page 16*

the Gila River. He was rescued by Pima Indians, but died from exposure. His body was buried on the old J. D. Walker ranch along the Gila River.

Waltz, now an old man and entirely alone, made his last trip to the mine in 1877. He filled his sacks with the fabulously rich ore, covered the entrance to the shaft with timbers and rocks, then loaded the sacks on his burros and headed down the creek never to return.

The Dutchman, as he was most frequently called, sorted out a few of the richest specimens to keep as souvenirs and sold the balance in Phoenix. With the proceeds he built a small adobe house in the flat country near the Salt River where he lived for a number of years.

In the month of February, 1891, a great flood came down the Salt River. It spread over the low lands and washed the Dutchman's house away. Waltz was rescued, but he soon died as a result of the exposure and shock. Thus, at the age of 84, he took the secret of the exact location of the mine with him to the grave.

There are many versions of the legend concerning the Lost Dutchman mine and, as usual, many "true maps" have made their appearance since Jacob Waltz passed away. Some of the maps place the location of the mine in the vicinity of Weaver's Needle where most of the prospecting in recent years has been done.

In addition to the 47 men who were killed in original Apache massacre, many others have lost their lives in and around Superstition Mountain. Often the searchers for the Lost Dutchman were inexperienced and died from hunger and thirst. Others, no doubt, were murdered, as was Adolph Ruth, for the information they were supposed to have.

From the Goldfield mine on the western foothills of the Superstitions, the formation is covered by a lava flow and does not lend itself to ore deposition until the border of the great granite batholith is reached. Here considerable mineralization occurs. It is the logical place in which to search for the Lost Dutchman mine. That is where it was located when Peralta, Ballesteros, and Jacob Waltz worked it. If the amateur treasure hunters and fiction writers have moved it, they have no one but themselves to blame for their failure to rediscover it.

A little intelligent prospecting on Pinto Creek in the vicinity of Iron Mountain might again bring to light the millions said to be locked up in the rich ore of the Lost Dutchman mine.

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Continued from Page 65

ledgers in the black by the end of 1950. Holes were drilled from the 2,400' level and ore vein discovered subsequently was cut by five holes over a strike length of 700'.

Ancho-Erie Mining Company, Graniteville, California, is developing the Erie vein at the 1,200' level by a 1,500' drift driven from Ancho workings. The Ancho vein is being mined from the 2,500' crosscut tunnel and from a 150' winze.

West of Graniteville, California, Snow Point Properties of Beverly Hills is drifting along a virgin section of the Snow Point channel which lies in the 900 acres of placer ground controlled by the company near the south bank of the Middle Yuba River. The drift is being run from a 250' vertical shaft. Gold has been mined from the thirteen-mile-long channel since 1850.

Operations have been resumed by the Luddicoat Gold Mines Company north of Greenwood, California. The company did considerable development at the property in 1947 and installed a new 50-ton mill. According to Joseph L. Luddicoat, president, a new milling grade orebody has been opened up, and the outlook for future operations at the property has improved greatly.

**NEVADA**

A rotary kiln, 380 long, 9.5 feet in diameter, and weighing 350 tons, is being installed at Basic Refractories' magnesite treatment plant, Gabbs, Nevada. Roasting of carbonate of magnesium converts it into magnesium oxide. The company has been shipping 4,000 tons of crushed brucite every month to its Maple Grove, Ohio, plant and expects to start sending shipments of calcined magnesite and brucite straight from Gabbs to U. S. markets when expansion of its plant and addition of further equipment are completed.

John J. Finch of Goldfield, Nevada, and Willis P. McAllister of New Mexico have taken a two-year lease on the 12 claims of the Gold Mountain Mining & Milling Company, two miles east of Goldpoint. The property is

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owned by the M. A. Brown family and is developed by five shafts varying from 200 to 500' deep and extensive underground workings. Equipment is being installed by the lessees for immediate operation.

The Cordero Mining Company has closed its mercury mine at McDermitt, Nevada, and will not reopen unless prices become commensurate with costs. During the war 197 mercury mines operated in the U. S. Now, according to J. E. Gilbert, manager of the San Francisco office of Cordero, his mine is the next to last to cease operating in this country. Worth noting is the fact that recently the federal government bought 80,000 flasks of quicksilver from foreign countries.

A 500' shaft is being sunk by Twilight Gold Mines at the old Reevesbeck property, 25 miles southeast of Fallon, Nevada, in the Sand Springs silver-gold district.

Deep-dredging operations have been started by the Natomas Company of Sacramento, California, at the Greenan Placers Operation near Battle Mountain, Nevada. Previously worked with dragline dredges, the property is thought to be exhausted of dragline possibilities. The Natomas bucket-line dredge is the first deep dredge to operate in the area.

New incorporations in Nevada include The Utah Uranium Mining and Reduction Company of Reno, Nevada,

which is capitalized at \$750,000; the Grano-Lite Gold Mining Company of Carson City, which is capitalized at \$250,000; the Last Chance Mining Company of Gardnerville, which is capitalized at \$250,000.

The sale of a mile-square section of perlite property at Lovelock, Nevada, to C. T. Hansen and Company, 423 Russ Building, San Francisco, California, has been announced by H. C. Schwabrow and Marion Schendel, owners of the land. Hansen and Company plans to install mining and screening equipment at the property. Three sizes of perlite will be sent to west coast processors for use in plaster aggregate and for insulating materials. The deposits are reported among the best for purity and "popping" quality in Nevada.

Frank McGill has taken a three-year lease on the old Schultz mine in Mill Canyon, 35 miles south of Beowawe, Nevada. He has completed installation of an ore bin, a compressor and other equipment and has sent one shipment of gold-silver ore to a Utah smelter. Further plans include the extending of the 600' tunnel at the mine another 300 to 500', shaft sinking, and driving of two 400' raises to the surface.

The Bootstrap property, 50 miles north of Battle Mountain, Nevada, has been bought from owner Frank Maloney by George Wingfield and Nobel Getchell of Reno, according to

reports. Maloney will drive a 600' tunnel to develop the mine. Most of the gold-bearing ore mined so far has been from a surface orebody adaptable to power-shovel operations.

NEW MEXICO

The New Mexico Consolidated Mining Company resumed operations at its Kearney mine at Hanover, New Mexico, at the end of February after being shut down since June 18, 1949. The company is a subsidiary of Peru Mining Company which is in turn a subsidiary of Illinois Zinc Company. The company was the first of several in the area to announce a resumption of production. According to Joseph H. Taylor, vice-president, the Peru Mining Company's Deming concentrator resumed operations March 6, treating the ores from Kearney mine. The company resumed operations when former employees requested it on the basis of a lower wage scale amounting to \$1.00 per hour and sliding scale based on the price of zinc. The minimum wage scale is 35% less than the wage scale one year ago. The maximum wage scale, when the price of zinc is 15c, will be the same as a year ago.

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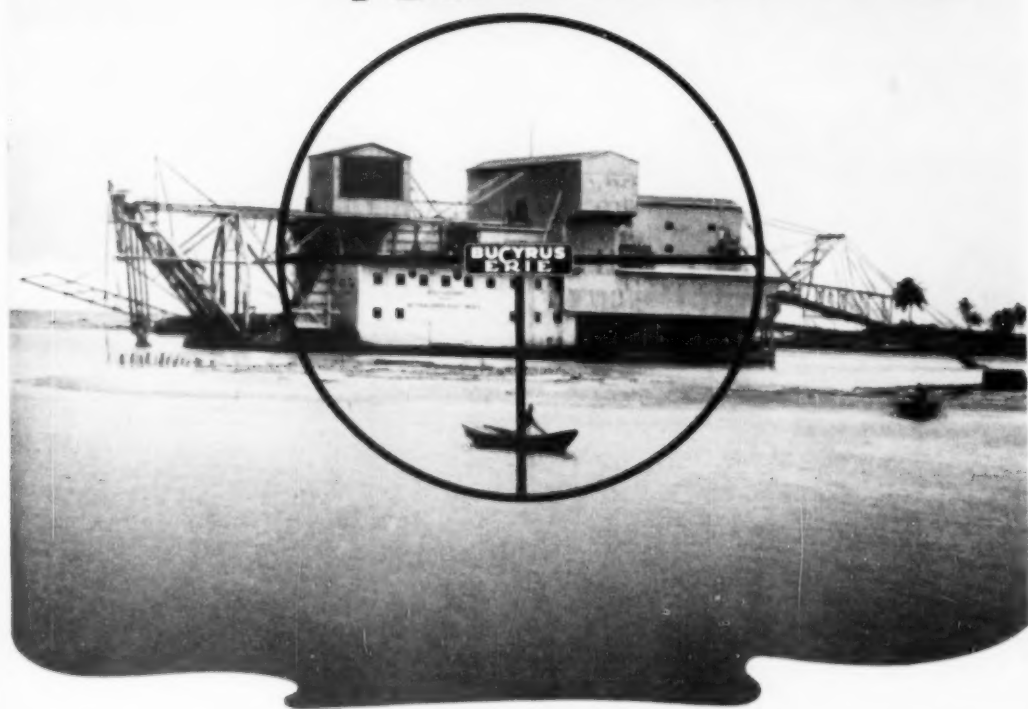
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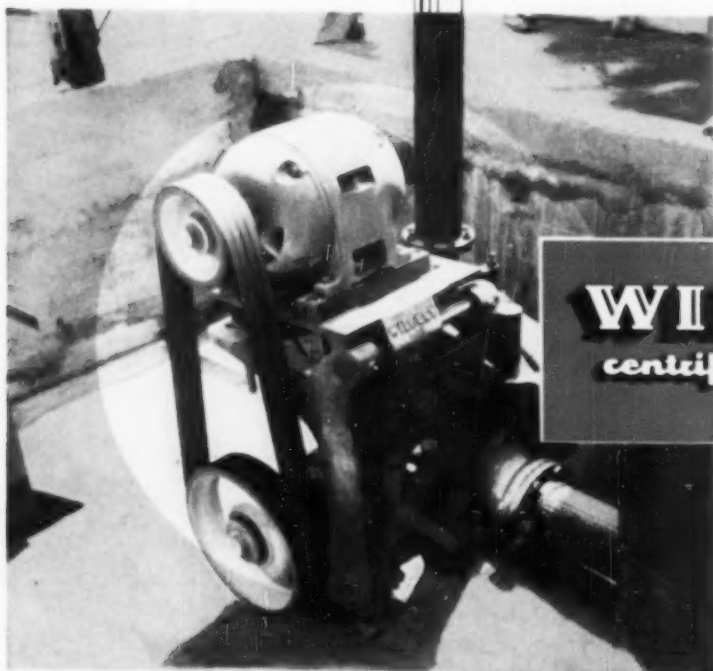
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